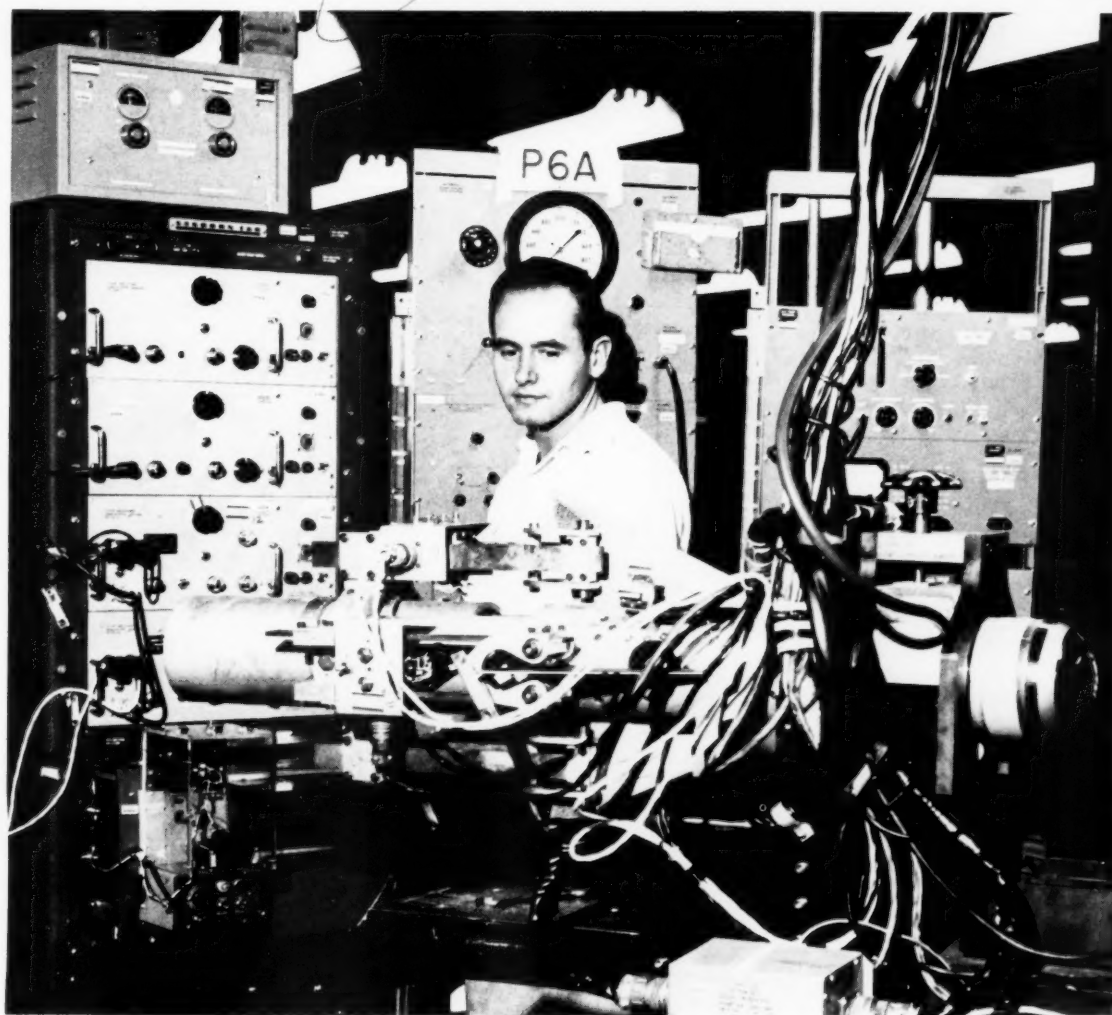


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SERVING THE ENGINEERING PROFESSION



GIVEN THE MEANS — PAGE THREE

Vol. 11

JANUARY, 1959

No. 8

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Published Monthly
BY
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AT
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CHICAGO 1, ILLINOIS

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Single Copy\$.50
Annual subscription 4.00
Foreign subscription 6.00

Entered as second-class matter at the post office
at Chicago, Illinois under the Act of March
3, 1879.

Midwest Engineer

A Publication of the

WESTERN SOCIETY OF ENGINEERS

Serving the Engineering Profession



January, 1959

Vol. 11, No. 8

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COVER STORY

The deadly accuracy of the Sidewinder's infrared "eye" and the missile's complete guidance and control system is checked out on simulated flight test equipment. Philco is the major producer of the air-to-air missile which has been used by the Chinese Nationalist Air Force against Chinese Communist jets.

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GIVEN THE MEANS

before the
International Visual
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Conference
in Chicago
on Dec. 13,
1958

Mr. Burdick, ladies and gentlemen: That so many of you have gathered in Chicago this week-end is certainly a tribute to the fine program arranged by your officers and committees. It also shows your own interest in a new and rapidly expanding field.

It would be exceedingly presumptuous of me today to attempt to discuss any of the many technical facets of the field of visual communications. Your deliberations during this conference will embrace matters far beyond my experience. Others—members of the Society of Re-

an

address by

EDWARD C. LOGELIN

vice president—Chicago

United States

Steel Co.

production Engineers and management representatives from industries devoted to visual communication—will, during the course of this conference, discuss with you much of the research in this vastly important new field.

I was pleased to learn that the Society of Reproduction Engineers, just two years old, already has over two thousand members in chapters extending from coast to coast. It is indeed gratifying that you people who work with equipment representing an annual investment by American industry of over five billion dollars take such an interest in learning how better to use this means of communication.

I would like to confine my remarks to one part of the important field of communications. All of us appreciate the need for a clear understanding within our own fields. We know, for example, that being able to express ourselves clearly by whatever means we use is just as important as knowledge of our own endeavors. The fact that you gentlemen are here today shows that industry generally appreciates the importance of continuing study of ways and means to improve communications.

Your interest in this field suggests that you may also be interested in other areas of communications where industry has a big job to accomplish. Foremost among these is the necessity for all of us in business to explain our role in our nation's economy.

As engineers you realize the need to establish standards of precision in describing our social and economic contributions—and do it as effectively as a blueprint describes a physical product. You and I as businessmen have a vital stake in world-wide understanding of our economic system. Forces are abroad in the world which publicly proclaim their intention to impose a new political-economic system upon us.

I think you will agree with me that business and industry have made far greater progress in the production and distribution of goods and things than in the communication of ideas. For example, we find ourselves much more able in designing, developing, producing and distributing a better mousetrap than we are in explaining the economic and political base necessary to develop the mousetrap industry.

Today we have a paradox which amply illustrates this fact. The means of communication at our disposal are more complete and more effective than ever before in history. Yet misunderstanding, antagonism and tensions—local, national and international—prove we have much to learn about communication of ideas. Yesterday's incident in a country halfway around the world wall appear on your television screens tonight. Yet the American economic system which made all of this possible is often completely misunderstood, and the ideals which motivate our nation are misinterpreted and maligned. Millions of people who hear a radio jingle and buy a product have no idea of the planning, risk capital,

research, production know-how, the managerial and financial skill that went into setting up the company which produced the product.

Now this unfortunate state of affairs certainly doesn't exist because nothing has been said about it. Indeed, today, there is probably more being published about the economic affairs of business and industry than has been said for the past several years.

Problem in Communications

Perhaps the problem lies in our communications. For communications is a two-way street. Talk and the printed word by themselves certainly don't guarantee communications. All of us know there was plenty of talk at the Tower of Babel, but look what happened to that project!

As you gentlemen well know, communications are never completed until understanding is established. Take for example the word "profit." I doubt if there is any word more misunderstood today. It is easy to talk of fair profit, reasonable profit or adequate profit without any concept of the job that a

profit must do. Clifford Hood, president of the United States Steel Corporation, and my boss, said:

"Profit and the expectation of profit comprise the very foundation of economic freedom in this nation. It seems to me, moreover, that any combination of factors which tends to lessen the role of the profit motive in our society will likewise have a diminishing effect upon all the freedoms we enjoy."

Even those untutored in economics agree that a company takes in dollars for the products or services it sells and pays out dollars for the products and services it uses. In the long run, if it takes in more than it pays out, a profit results. At present, unfortunately, it has been our experience that there is an alarming trend in public opinion and even among some employee groups to believe that there is something illegitimate about making a profit. We are somewhat disturbed that so few people seem to know the real purpose or value of profit. Much of this lack of understanding is spurred on from high places in government and some union circles. In fact, predicated on testimony before certain

congressional committees, it would appear to be a sin to make a profit. Quite likely the man on the street and the housewife in the super-market would insist they know the full meaning of free enterprise, yet they often are quite vague as to what profits are used for and how important they are to our free enterprise system. They many times fail to realize that a year-end balance in favor of the company may be paid out partly for the use of the stockholders' money and partly to replace or expand present and future facilities. It does not, indeed, go into the board chairman's safety deposit box.

American Efficiency

Another term often used, but perhaps not fully understood, is "American efficiency." It is certainly not a new phrase; in fact, a short time ago a statement was called to my attention which was written more than a quarter of a century ago. The statement read:

"American efficiency is that indomitable spirit that neither knows nor will be deterred by any obstacle, plugs away with businesslike perseverance until every impediment has been removed,

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A revolutionary fish net, being erected across the Snake River above Brownlee Dam, in Idaho, is designed to save downstream-bound salmon and steelhead fingerlings from a 395-foot drop over Brownlee spillway, reports "Engineering News-Record." The cost for the nets and pipelines through which fish are sent downstream, is five million dollars.

that simply must go through with the job once it has been tackled."

This is a fine tribute to American efficiency. In fact, you might suspect that it was written by a business or industrial leader. But not so. It was written by a man who certainly could not be accused of approving of our American system. His name was Joseph Stalin.

It is a curious commentary upon our times that those who openly despise our system suggest that their own countries adopt our methods to achieve their goals.

Now we know that the so-called American efficiency which Mr. Stalin seemed to admire and despise at once depends not only upon the moral fiber of a people determined to strive constantly toward a higher standard of living, but also upon a system which permits the accumulation of the many tools which make our way of life possible.

As the *London Economist* put it:

"If our children are going to produce twice as much as we do, they are not going to do it by working harder than we do, or by being cleverer than we are, but by having twice as many machines to assist them. The way to plenty is to build up the national capital of machines, of buildings to house them in, of power to drive them, and of communications between them."

This statement applies equally to your business and mine, to the biggest businesses and to the smallest. Ultimately the source of capital to provide these tools must come from profits.

I like to recall a young businessman—I believe he was 12 or 13 years old at the time—who had a successful paper route. He was getting along pretty well; the newspapers he sold were popular with his customers and he did a consci-

entious job of delivering them each day as soon as possible after receiving them from the distributor. As his route grew, he found that he was making a little more money, but he was rapidly approaching the point when delivering the papers would take more time and strength than he felt he had.

Realizing that a bicycle would allow him to deliver more papers—thereby increasing his earning capacity—the young man took his own savings, which were profits from the paper route, plus a small loan which he managed to secure from his father, and purchased a bicycle. He undertook to sell quite a few more papers, and, as a matter of fact, did increase his gross revenue substantially.

Now this story should have a happy ending. Unfortunately, the paper he delivered underwent a change in editorial policy and subsequently fell out of favor with its readers. Circulation dropped. The young man found that he was having a very difficult time meeting the loan payments, and that his pocket no longer jingled with profits from the paper route. As a matter of fact, he had to mow a lot of lawns and wash a lot of cars to meet his obligations.

The story really does have a happy ending though. The young newspaper carrier is now a grown man operating his own successful business, and enjoys an excellent reputation in his own business community. He has often said that the lesson he learned regarding the importance of profit has been of substantial benefit to him over the years.

Need of Profit

The necessity of making a profit applies to all businesses, big and small. In order to attract venture capital any business, regardless of its size, must have a good prospect of meeting its obligations, and of paying a reasonable return for the use of the savings of people.

This concept is easy to grasp when applied to the boy and his paper route. Why then does it become cloudy when applied to corporations? Is it that we as American businessmen have failed to tell our fellow Americans all the facts about profits and what profits do for people? Apparently we haven't done enough. Many people seem to think of profit as so much gravy, nice to have but not really necessary. They will agree that the company is entitled to a profit

as a reward for services rendered, yet they look on it as something extra that could be dispensed with without fatal consequences to either the company or to the national economy.

And there are many people who hold widely varying opinions as to how much profit, if any, a business is properly entitled to.

I bring these matters to your attention because it is a problem facing all of us here in America. You people who are intimately associated with one means of communications are, I am sure, interested not only in your own field but also in the health of business and industry across the nation.

Few people, I suspect, have any idea what actually does happen to the profits of a corporation; what they are used for, where they go and how they affect the well being of people, of employees and shareowners, customers and suppliers and all of the other people of the community. So, by way of example, let's look for a moment at the records of one corporation. Since I happen to work for United States Steel and am more

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A nationally-known business address

familiar with it than any other company, I would like to use it as my example. I'd like to cite an illustration used recently by Roger M. Blough, board chairman of U. S. Steel.

Out of every dollar our customers paid us last year (1957), Mr. Blough explained, we spent ninety and one-half cents to meet our bills—to pay for the wages, salaries and benefits of our employees, to pay for all the materials and services we bought from our many thousands of suppliers, to pay our taxes, and to meet—in part—the cost of replacing the plants and facilities that wore out during the year. That left us nine and one-half cents profit.

Where Profit Goes

Now, what happened to that profit? Where did it go?

Well, first of all, we had to finish the job of providing for the replacement of tools and equipment that were used up last year in production. Depreciation allowed by the tax laws was not sufficient to meet this replacement cost, so we had to devote two cents of our profit to this purpose. This two cents, although called profit, was spent to keep our facilities intact. It added nothing to our productive capacity—we had to use it just to stand still.

And that left us, Mr. Blough stated, with seven and one-half cents to perform the function that profits are called upon to do. The first thing we had to do with a part of the remaining seven and a half cents was to pay an installment on a three hundred million dollar loan we got several years ago. That took about seven-tenths of one cent and left six and eight-tenths cent of the profit. Next, we had to pay the owners of our business for all of the billions of dollars worth of plants, furnaces, mills, machines, equipment and tools that they provided for the company and for the use of our employees. So, four cents went to them in dividends for this purpose.

Now all that was left of our profit then was two and eight-tenths cent to "grow on." What happened to this money? Was it salted away in a bank or hoarded to use on some rainy day?

Not a bit of it! This was the money we spent to develop new sources of iron ore and other raw materials—to enlarge and improve our research laboratories; to build our sintering plants and coal

washers and other facilities that will help us to hold down the cost of steel. These are expenditures to enable us to play a responsible part in meeting the future steel needs of this growing nation of ours.

So that's what happened to the profit that United States Steel earned last year. Every penny of it came from the people; and every penny of it went back to people. As Mr. Blough said, it represented from people to people in one operation!

But in the course of its travels, that profit made possible the production of millions of tons of quality steel and other products that the American public wanted, needed, and used. Thus, it added enormously to the material wealth of the nation as a whole. It was in truth, a "working profit," working for the welfare of everyone.

Money and Employment

Money taken in from our good customers last year (and believe me all of our customers are good customers) provided employment for better than a quarter of a million of our employees. At the same time, the better than 1.3 billion dollars paid by U. S. Steel for products and services provided employment by our suppliers, and by their suppliers in turn, to many, many thousands more people working in large and small firms across the land. The products

we sold contributed to the income and employment of many thousands of other people.

The dividends we paid as compensation for the invested savings of our nearly 300,000 individual stockholders contributed to their livelihood.

I would like to make one more observation on this last point, and that is, the misconception some people have that businesses are owned by a few wealthy individuals or groups. Today, American business is owned by millions of people in all walks of life. In United States Steel, for example, the owners of our business outnumber the employees by a considerable margin. No one individual holds as much as two-tenths of one per cent of the outstanding stock.

A few years ago we took a survey among our stockholders which yielded some surprising information. It showed that more than half of our shareowners had incomes that were less than the average wages we were then paying to our steelworkers. Nearly three-fifths of these stockholders had incomes of less than \$5,000 a year, and about a third of them were in the brackets below the \$3,000 a year level.

So, if the ownership of United States Steel is fairly representative of that of other large American enterprises it would seem highly probable that the majority of owners in so-called big business are "littler people" in the economic

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sense than many of the owners of so-called small business.

What would happen if over a long period of time American industry did not make a profit? Well, for one, the people who provide us with the tools which help us grow with the nation and improve our product constantly—as we have during the past—would have no reason for risking their savings.

Without adequate profits, industry would be unable to replace its tools of production as fast as they wear out, at which point the workers who once used these tools would be without work.

Without enough profit industry could no longer develop the new sources of raw materials the nation must have to grow with; to meet the needs of our expanding population, and to realize our completely reasonable desire for an enhanced standard of living.

Without profits, industry would be unable to obtain the new, more efficient machines that have thus far enabled it to absorb much of the rising cost of labor and materials. Prices would then have to rise at a headlong pace.

And without profits, industry would be totally unable to finance the research which we expect will develop the techniques, the machines; indeed, all of the tools which enable each of us to contribute more to our own and our country's well being.

Your conference theme, "Research Today—Product Tomorrow," points up the importance of the requirement for profit. Certainly, I don't need to tell you the value of engineering research. During these convention days you will see and hear about many new products which could never have been developed without the cooperation of many thousands of people in providing and using the tools of research.

So it seems to me that all of us here have a two-fold interest in the means of communication. We want to learn what is new in the field, and we want to encourage continued research. Certainly all Americans have a common interest in seeing that we have the means to continue to develop our talents as effectively as possible.

Given the tools—the capital and the know-how—American industry can meet the challenge of continued growth.

Given the means, which must come from profits, America *will* do the job.

MIDWEST ENGINEER

Planned Obsolescence

By Brooks Stevens
Industrial Designer, Fellow A.S.I.D.

The industrial designer in today's business world should be basically a business man, an engineer, and a stylist—and in that direct order.

Being a business man is entirely important to the successful professional industrial designer in order that he understand the inherent problems of his client and within the industry in which he intends to serve that client.

These are business conditions which may definitely alter the designer's thinking with regard to the design approach. Product design, successfully handled by a specialist in the field, must comply with the conditions within the industry and definitely fit specific marketing factors; these may differ tremendously from a washing machine to a lawn mower or to an automobile.

Even though we are dealing with the same consumer—Mr. and Mrs. America—for consumer goods, so to speak, the marketing problems and the business atmosphere of the different manufacturers may vary—even geographically—and certainly they vary with the purchasing power in the areas served.

The industrial designer must be enough of an engineer to understand manufacturing problems, plant tech-

niques, equipment limitations, material uses, and costs. It would be useless for the professional stylist or industrial designer to foist a so-called absolute design, artistically speaking, upon his client and, in turn, his client's market, without regard for its engineering flexibility, its conformation with plant equipment, and costs of production.

The industrial designer, of course, creates his special niche in the economic and business life of his country by adding the stylist's touch to make manufactured products desirable to the consuming public and to give the products that last degree of "buy-appeal" necessary to make the sale.

Styling, at the absolute expense of the best business approach, the best engineering approach, and the proper manufacturing approach and its costs, would be superfluous and unnecessary.

The industrial designer is not a fine artist producing works for exhibition purposes only. It is all well and good to talk about the relationship of art to industry, and art for art's sake, and to stress the point that the industrial designer must add the esthetic touch to big business and force business to recognize what is the very best in design and

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art, but art for art's sake is not salable in the market place of consumer goods.

The industrial designer's first obligation is to his client primarily because he is retained by his client and derives his income for his services from that manufacturer. His next obligation is, of course, to the economy of the nation. If his contributions to his client are properly handled and taken care of, this obligation to the economy is automatic. The consumer obviously benefits from this service and its subsequent execution by the manufacturer into the finished marketable goods in that he attains a distinctly higher standard of living. We must remember that it is the consumer's own choice in the market place as to whether he buys a product or not, when and if he pleases.

The 1958 automobiles exemplified by certain makes were very good examples of styling errors and esthetic concepts that were not of the proper acceptable standard. These examples were met by consumer refusal. A recessionary atmosphere followed in direct proportion to this motor car purchase refusal and these potential customers were referred to as "lookers" and not "buyers." A chain reaction was then begun to the detriment of manufacturers in every field.

Immediately, the ivory-towered intellectuals, newspaper commentators and TV commentators came forth to condemn everything in business, including, of course, "planned obsolescence." With this condemnation they decided to support and publicize the need for the European small car—why doesn't America have a Volkswagen, et cetera. The crucifixion of Detroit and its chrome-plated befinned monsters continued to be the front page news. It even reached certain stages of the government and the presidential speeches were flavored with examples of people buying products that were extreme or unnecessary.

As negative as the 1958 automotive model acceptance seemed to be last year, I am quite sure that the recent introduction of the '59 models has already reversed the trend and that the smaller, unadorned European type car may be buried again because there is such great acceptance of the '59 models from Detroit.

There is certainly one definite esthetic improvement in the 1959 cars: there is much more restricted use of chrome trim and superfluous moldings. The trim is much more tastefully done, doing a

A battery-operated train is being tested in Scotland, reports "Product Engineering." The battery, which is arranged in cradles under each coach, consists of two sections, each weighing eight tons, and with 216 lead-acid cells. The 440-volt battery has a storage capacity of 1,070 ampere-hours.

much better job of accenting the basic sculptured forms.

I believe that ten points are necessary in clarifying "Planned Obsolescence" and I should like to begin with the definitions originally given over five or six years ago when this philosophy was first utilized in public addresses.

"Planned Obsolescence" was then defined as . . . "the desire to own something a little newer, a little better, a little sooner than is necessary."

Point No. 1 in the clarification of this philosophy is that this does not mean organized waste because used articles are not generally discarded or thrown away upon replacement by new ones. They move into the used product market to reach someone of lesser purchasing power in a much finer condition than the subsequent buyer could otherwise afford. This is certainly exemplary in the used car market. There are people who are able to buy fine automobiles today of one year's age with less than fifteen thousand miles at reduced price. It is quite likely that these people could not

otherwise afford transportation of any reputable kind.

Point No. 2. It is erroneous to state that people are *duped* into buying things unnecessarily. They are not led into the market place by law enforcement officers; the products they buy are of their own choosing and they result in pleasure and satisfaction of ego. I am certainly not one who feels that keeping up with the Joneses is demoralizing.

Point No. 3. This attitude and general philosophy keeps employment at the highest possible record, and purchasing power at a maximum; in turn, these combine to increase the standard of living for all.

Point No. 4. It is false to assume that annual models of products are not improved with new functions as well as style. These products are a much greater value at a comparable cost to previous models.

Point No. 5. New model announcements annually create an atmosphere charged with public interest and anticipation, and prosperity for sales and industry, which can only benefit the customer who is the very worker then provided with a job and subsequent purchasing power.

Point No. 6. The continual manufacture of any given-model-year automobile would soon produce a blandness of interest, and sales only to those who needed a vehicle due to car age and mechanical fatigue.

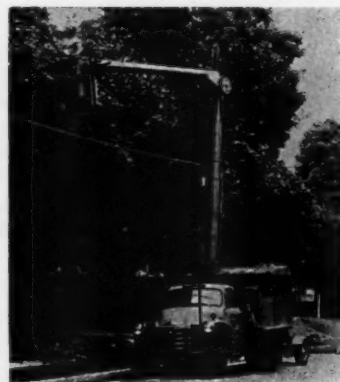
Point No. 7. The loudly publicized smaller unadorned automobile in America is a case in point. This car is not easy to build in the United States for appreciably less money and will not compare in pride of ownership with a one-year-old Oldsmobile Holiday Coupe in desirability or in cost.

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Point No. 8. If this smaller less adorned automobile were the answer to the American economy why then did the very nicely styled 104-inch wheelbase Willys automobile pass out of the American market. It was a victim of more impressive used cars for less money.

The Ramble story, which is often utilized to point up the lack of need for "Planned Obsolescence," and the desire on the part of the public for a small European type car, brought back the 1951 Ramble tooling in 1958 and offered the Rambler America model. It was, however, outsold by its bigger sister, the 108" wheelbase Rambler by many, many thousands of vehicles.

It is also interesting to note that the medium sized sister, the 108" Rambler, was not unadorned, and in 1957 was forced to sprout fins on its rear quarter panel. In 1959, it expanded these fins to move forward into the rear doors, and increased its chrome side applique trim.

Point No. 9. The cry for rationality, the so-called chromeless practical cars and products, is a step toward regimentation, lack of identification, and a blandness of acceptance, which can only be cataclysmic, economically.

Point No. 10. The tenth and final point must obviously be this. "Planned Obsolescence" is not an unsound philosophy and planned obsolescence versus "natural" or "genuine" obsolescence is not the question at all. In manufactured products today—improved by research and development based on industry profits—there can be no obsolescence without a plan. These products are not born; they do not grow in the ground, but are man-built and planned.

In closing, may I state that regimentation of any kind is dangerous and borders on socialism and a lower standard of living.

Rapid Transit Trains Will Not Need Crews

Crewless rapid transit trains were envisioned in New York on Feb. 6 during the Winter General Meeting of the American Institute of Electrical Engineers.

"From a practical standpoint the time may be quite near when crewless trains are operated on some rapid transit lines," said G. W. Baughman, of the Union Switch & Signal Co., Swissvale, Pa., in a paper, "Traffic Control for

Railroads," presented at a symposium on railroad traffic control.

The direction of trains from a central control point by control of signal indications "has advantages over previous methods" whether for light or heavy traffic density on railroads, including rapid transit, he said.

In general a single track railroad with traffic control will handle 80 per cent of the traffic capacity that could be handled on two tracks without this type of control. He added, that after centralized control has been installed on a single track railroad, improvement in the movement of a freight train is indicated by a savings of approximately one minute for each mile of length of the installation. He said that this type of control also is being installed in some foreign countries.

Baughman pointed out that the railroads "have been among the leaders in adopting and progressing technical advances," including the use of telegraph, the telephone, electronic devices, and diesel electric locomotives.

As to the use of electronic devices, including radar, in classification yards, he said that "these installations are among the nearest approaches to full automation in service today."

IIT Will Study Fracture of Metals

A study of the ductile fracture of metals will be made at the Illinois Institute of Technology under a grant of \$36,500 from the Air Force Office of Scientific Research.

Directed by Dr. N. H. Polakowski, professor in the metallurgical engineering department, the program will probe the rather obscure laws governing the failure of metal when it is drawn out or hammered thin. Information in this little explored field, Polakowski said, will be of great value to industry and metal science.

Eye-Level Signs

Lakeside, Va., makes the motorists' task of finding street markers much easier, states *Engineering News-Record*. This suburb of Richmond uses four-foot high street signs, just about the eye level of drivers. The signs save neck-craning, put letters within headlight range and are not hidden by tree branches.

WSE Nominating Comm. Appointed

To the Corporate Members:

I am pleased to announce that in accordance with Article X, Section 3, of the Constitution, the Board of Direction has appointed a Nominating Committee as follows:

W. M. Ballenger
A. P. Boysen
J. P. Ganedinger
W. W. Pomerhn
H. P. Sedwick
F. V. Smith
A. L. Tholin

The Constitution also provides that suggestions for nominees shall be solicited in the publications of the Society.

J. EARL HARRINGTON
Executive Secretary

Tear off and Return

To the Nominating Committee:
Western Society of Engineers:

I suggest the following names for consideration by your committee for offices indicated.

Officers and Trustees

President
1st Vice Pres.
2nd Vice Pres.
Treasurer
Trustee (eight to be nominated)

1.
2.
3.
4.
5.
6.
7.
8.

Members of

Washington Award Commissions

Past Pres. of WSE
Member not a Past Pres.
or at present a member
of the Board or candi-
date there
Signed
Address
Date

Nuclear Energy "is No Answer"

Nuclear energy itself is "not the answer" to future fuel needs of this country, the American Institute of Chemical Engineers was told in Cincinnati, Ohio on Dec. 9 during its 51st Annual Meeting in the Netherland-Hilton Hotel.

W. Kenneth Davis, vice president of the Betchel Corp., San Francisco, and former director of reactor development for the U.S. Atomic Energy Commission, said that "at most we can anticipate only about 25 per cent of our total energy requirements coming from nuclear power even after it is fully developed and economically competitive. This is quite a substantial contribution, being about equal to all energy consumption in the United States today, since consumption is expected to just about quadruple by 2,000 A.D. However, the really significant point is that nuclear energy by itself cannot satisfy the ever-increasing demands for energy and is not the answer that will be so badly needed by a country and a world running out of fuel resources in another 50 to 75 years."

Mr. Davis spoke after receiving the Institute's Professional Progress Award "for his leadership in the engineering development of nuclear power." He was the 11th winner of the Award which is given annually in recognition of outstanding progress in the field of chemical engineering.

There are adequate reserves of nuclear fuels but "breeding" is important for their efficient utilization, he said.

"Nuclear power (and the thermonuclear power, when developed) has serious limitations which prevent its direct use for meeting the larger proportion of the foreseeable energy requirements. No other energy source now visualized will meet the overall requirements.

"It is desirable and will later become necessary to conserve reserves of conventional fuels not only for non-fuel uses such as lubricants, chemicals, plastics, etc., but for the many specialized energy applications which can only be reasonably met with conventional fuels.

"Methods of storing thermal or electrical energy for use in mobile applications and in many specialized uses should be developed and will become of increasing importance in future decades.

"Methods of energy utilization which permit greater use of electric power or of heat from large central units will

become of increasing importance in the overall economy and the energy use pattern can be expected to shift in this direction.

"There will inevitably remain serious problems for the scientist and engineer in the supply of energy in appropriate forms for use. How this will be accomplished is a profound and unanswerable question at the present. It is, indeed, one of the most important and exciting challenges to future engineers—and one which I am completely confident will be successfully met."

Large Scale Quartz Production is Possible

Large scale production of synthetic quartz, thus freeing United States users from dependence on foreign sources of natural quartz, is possible, it was reported Dec. 10 in Cincinnati at the 51st Annual Meeting of the American Institute of Chemical Engineers.

The report was made by R. A. Laudise, Bell Telephone Laboratories, Inc., Murray Hill, N. J., and R. A. Sullivan, Western Electric Company, Merrimack Valley Works, North Andover, Mass., in a paper, Pilot Plant Production of Synthetic Quartz. The paper described the production of synthetic quartz at the Merrimack Valley Works, and said that "it appears that large scale hydrothermal production of quartz can become an economical manufacturing process."

"The stones produced in the pilot plant are of excellent quality and initial estimates of the feasibility of the process appear to have been conservative," they said. "The usability ratio, that is, the

ratio of the weight of finished filter plates to the weight of quartz starting material, for synthetic quartz was found to be substantially higher than for natural quartz due to the fact that the synthetic quartz was untwinned, of uniform quality, and the synthetic stones were nearly identical regular parallelepipeds which could be cut with minimum wastage."

Quartz crystal is an essential component in long distance communication equipment. Although silicon in the form of dioxide and as small quartz crystals comprises about one-tenth of the earth's crust, natural quartz crystals of a size and quality suitable for communication use are found principally in Brazil, where it is mined, not by large scale operations, but by individuals. United States users have been entirely dependent on the Brazilian supply of quartz, and the supply has become unstable "due to the apparent depletion of large stones."

The two engineers described hydrothermal crystallization "as the use of an aqueous solvent under high temperature and high pressure to increase the solubility of an ordinarily difficulty soluble material to a point where it can be crystallized on a seed crystal at an appreciable rate without excessive nucleation." Interest in synthetic quartz dates from 1851, but no commercially feasible production method has been discovered until recently.

Sweet Tooth

Child patients of one Los Angeles physician like to tell their mothers, "I have a sore throat, take me to the doctor." The doctor, in this case, uses candy-coated tongue-depressors, reports *Food Engineering*.

The Haines Company

Ventilation & Air Conditioning Contractors

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— Welding —

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News
W E
S

of

Engineers

WSE Life Member **Ira L. Reynolds** recently retired from his post as Administrator of the Contract Control Department of the office of Inspector of Naval Material.

Mr. Reynolds became a member of Western Society in 1919 and attained Life Member status in 1949.

* * *

Virgil H. Disney, director of Electrical Engineering Research at Armour Research Foundation, has been elected president of the National Electronics Conference for 1959.

Other officers named for the next NEC—to be held October 12-14 at the Hotel Sherman in Chicago—are:

Executive vice-president: Lawrence W. Von Tersch, Michigan State University; secretary: George E. Anner, University of Illinois; treasurer: Gordon J. Argall, De Vry Technical Institute, and assistant treasurer: Harold E. Ellithorn, University of Notre Dame.

Disney, long-time participant in NEC committee work and holder of many offices, is a representative of Illinois Institute of Technology in NEC functions. He is a member of the Institute of Radio Engineers, the American Institute of Electrical Engineers and the Engineers Club. He belongs to Tau Beta Pi and Eta Kappa Nu. A native of Moberly, Missouri, he now resides in Elmhurst, Illinois, with his wife and three daughters.

The newly-elected NEC chairman of the Board is Alfred Crossley, president of Crossley Associates, Inc. Executive secretary elected for 1959 is Joseph J. Gershon, DeVry Technical Institute.

Over 10,000 registrants are expected at the fifteenth annual meeting of NEC in Chicago in 1959. Known as the nation's leading forum of electronic research, development and application, it is sponsored by: American Institute of Electrical Engineers, Illinois Institute of Technology, Institute of Radio Engineers, and Illinois and Northwestern Universities. Participants are: Michigan,

Michigan State, Notre Dame, Purdue, Wayne State, and Wisconsin Universities, Electronic Industries Association and the Society of Motion Picture and Television Engineers.

* * *

Donald D. King, a licensed professional engineer of Manhasset, N. Y., has been named assistant to the secretary of the American Society of Civil Engineers with headquarters in New York City, according to an announcement by William H. Wisely, executive secretary.

King previously had served on the headquarters staff of ASCE and for a period was an editor of *Civil Engineering*. He also was associated with other magazines in the engineering field, including *Contractors & Engineers*, *Construction Equipment* and *Construction Methods*.

A graduate of Iowa State College with a degree in civil engineering, he is a member of ASCE and has served as a member of the Executive Committee of the National Safety Council Construction Division.

* * *

T. Hamil Reidy has joined the staff of Lester B. Knight & Associates, Inc., consulting management engineers, as vice-president. Mr. Reidy formerly was chairman of Skymotive, Inc. and earlier

was a partner in the investment firm of Rodman & Renshaw, founder and president of Helicopter Air Service, Inc., and sales engineer with Bethlehem Steel Corporation.

* * *

Dr. George S. Gordon, 39, has been named director of chemistry and chemical engineering research at Armour Research Foundation of Illinois Institute of Technology.

His appointment, effective January 1, was announced by Dr. E. H. Schulz, vice-president for research operations of the Foundation.

Most recently Gordon served as research programs coordinator for the U.S. Borax Research Corporation, Anaheim, California, where he was in charge of the evaluation—economical and technical—for the company's research projects. Prior to that he was associate director of chemical research for U.S. Borax.

As director of research for United States Potash Company from 1955 to 1956, Gordon was instrumental in developing the company's research program and planning and equipping its research laboratory.

From 1951 to 1955, he was vice-president of Titanium Zirconium Company, Inc., and headed all technical aspects of the company's operations.

In his new position Gordon will direct areas of research and development in analytical chemistry, biochemistry, organic and polymer chemistry, propellant, fine particles, chemical engineering and physical chemistry. The staff in chemistry research is comprised of about 185 people.

A graduate of Phillips Exeter Academy, Gordon received his bachelor of arts degree in chemistry from Princeton

DUNCAN ELECTRIC COMPANY, Inc.

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Manufacturers of

WATTHOUR METERS

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in 1941. He obtained his doctorate in chemistry in 1949 from Northwestern, where he was awarded a fellowship by Standard Oil Company (Indiana).

His affiliations include Phi Beta Kappa, Sigma Xi, Phi Lambda Upsilon, American Chemical Society, and Dial Lodge. He is a member of the executive board of Family Service Agency of Princeton.

WSE Member **T. G. Nichols** was recently appointed to the position of Superintendent of Plant Facilities of research services at the Armour Research Foundation of Illinois Institute of Technology.

Marvin R. Paullus, St. Louis, has been elected president and chief executive officer of Leonard Construction Company, with headquarters in Chicago, it has been announced.

Paullus replaces C. F. Keife, who resigned as president but will remain with the company in a consulting capacity.

R. A. Peters, formerly construction manager with Leonard, was elected executive vice president.

Paullus, a graduate of Purdue University with a BS degree in chemical engineering (1938) joined Monsanto Chemical Company in 1941. He served in various engineering and sales capacities with that company until his association with Leonard.

Peters, who graduated from Chicago Technical College with a BS degree in civil engineering (1938), has been with Leonard Construction Company since 1940 in various engineering construction positions.

The Leonard Construction Company has been in the industrial and chemical plant construction field for more than 50 years, and has engineered and constructed plants in many foreign countries as well as in the United States.

Inland Steel Company has announced comprehensive changes in its official personnel, effective at once. Eight officers were elected to new or different posts by board action on Jan. 16.

Joseph L. Block, formerly president and chief executive officer, becomes chairman and remains chief executive officer. The company has not had a chairman since the retirement of Clarence B. Randall in 1956.

Philip D. Block, Jr., formerly senior

vice president in charge of raw materials, has been elected vice chairman and will assume the responsibilities of the chairman in his absence.

John F. Smith, Jr. has been elected president. He has been vice president in charge of sales since 1952.

Hjalmar W. Johnson, 1st vice president of WSE, vice president in charge of steel manufacturing for the last ten years, has been elected vice president in charge of planning and research.

Francis M. Rich, MWSE, becomes vice president in charge of steel manufacturing after serving for 9 years as general manager of Inland's Indiana Harbor Works, the third largest steel plant in the country.

Robert M. Buddington, who has been general manager of sales since 1954, has been elected to succeed Smith as vice president in charges of sales.

Lemuel B. Hunter has been elected to the newly created position of vice president-administration, after serving for two and one-half years as assistant to the president.

Carl B. Jacobs, who has been general manager of raw materials, succeeds Philip D. Block, Jr. as vice president in charge of raw materials.

Joseph L. Block has been president of the steel company since 1953 and chief executive officer as well since 1956. Block rose to that position through the sales department which he entered in 1923 after a year in the mills. He was vice president in charge of sales from 1936 to 1951, and then successively vice chairman and executive vice president. He completed in February two terms as president of the Chicago Association of Commerce and Industry.

The new chairman is 56. The average age of all the company's officers is 50.

Philip D. Block, Jr., has been in the raw materials department since 1931, as assistant vice president from 1935 to 1948 and vice president in charge since that date. He has been with the company since his graduation in 1928 from the Sheffield Scientific School of Yale University. Under his administration the company has developed a well-rounded program in iron ore, limestone and coal working toward a goal which he established of reserves for more than 50 years ahead.

Smith started with the company as a production clerk at its Indiana Harbor Works in 1929, became a sales department clerk in 1930, assistant manager of the order division of the sales department in 1937 and manager in 1940. Thirteen years ago he was made assistant manager of sheet and strip sales, moved up to general manager of sales in 1948 and succeeded Joseph L. Block as sales vice president in 1952.

Johnson entered the company in 1929 and in 1930 was made superintendent of blast furnaces, a phase of the steel industry in which he has become a leading authority. His contributions to the science and operation of blast furnaces won him last year the Benjamin F. Fairless award of the American Institute of Mining, Metallurgical and Petroleum Engineers. Under his administration the Indiana Harbor Works of the company has practically doubled its steelmaking capacity.

Rich, who succeeds Johnson as vice president in charge of steelmaking, has been general manager of the Indiana Harbor Works during its period of greatest growth and has just guided it

Come to the WSE Wednesday Noon Luncheons

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Adjournment 1:15 Sharp

Hold these dates:

March 4, 11, 18, and 25

through a vast three year expansion program. He came to Inland in 1950 after 25 years experience in a number of steel plants including the South Works of United States Steel in South Chicago, the Wisconsin Steel Division of International Harvester Company, Youngstown Sheet & Tube Company, Republic Steel Corporation, Steel Company of Canada and Kaiser Steel Corporation.

Buddington has been with the company since 1939 except for a four-year stint as a naval pilot in the Pacific in World War II. He was a salesman from 1946 to 1949, then successively assistant manager of sheet and strip sales, manager of the Chicago district sales office, assistant general manager of sales. He was made general manager of sales in 1954.

Hunter started in the company's limestone quarries at Port Inland, Michigan, in 1937, later worked at the coal and iron ore mines and for a period in the Indiana Harbor Works. He was made fleet manager in 1943, manager of the raw materials department in 1948, industrial relations manager in 1950 and president of Inland Steel Container Company, a drum and pail manufacturing division in 1953. He moved from that position to become assistant to the president in 1956.

* * *

Philip J. Larson, MWSE, has been appointed regional contracting manager—midwest area, for American Bridge Division of United States Steel Corporation with headquarters in Chicago, it was announced Dec. 12 in Pittsburgh, Pa. by Wallace B. Hunter, vice president—contracting of American Bridge.

Larson formerly was assistant to vice president in Chicago. He will supervise district contracting offices in Chicago, Cincinnati, St. Louis, Minneapolis, and Gary, Ind.

Four other regional contracting managers whose combined responsibilities cover the entire country were also appointed. Taking on new assignments, in addition to Mr. Larson, are J. H. Long, whose eastern area headquarters will be in New York; Donald J. Morfee, central area, Pittsburgh; Walter Schielke, southern area, Houston; and James C. Hamilton, western area, Los Angeles.

Mr. Morfee formerly served as senior contracting manager in Chicago while the other four appointees were assistants

to American Bridge vice presidents in the cities where they will make their headquarters.

In making the announcement, Mr. Hunter said that the new positions had been made appropriate by the expansion of American Bridge responsibilities in recent years, and the development of new products and services offered to customers. Each of the five men will be responsible for the administration of all American Bridge contracting offices in their respective areas.

Born in Minneapolis, Mr. Larson joined American Bridge in that city, serving in several engineering and contracting positions until 1936, when he was appointed assistant to contracting manager for the division in St. Louis.

In 1939, Mr. Larson was promoted to contracting manager in Chicago, serving in that capacity until being named senior contracting manager in the same office in 1954. His appointment as assistant to vice president was made in October, 1957.

A past president of both the Chicago Engineers Club and the Downers Grove, Ill., Village Forum, Mr. Larson also is a member of the Chicago Athletic Association and the Western Society of Engineers.

Prior to his present assignment, Mr. Morfee had served as senior contracting manager in Chicago since October 4, 1957. A native of Gary, Ind., he had previously served as assistant contracting manager and contracting manager in Boston for seven years. He joined American Bridge at its Gary plant in 1948 as a draftsman and served there until 1950.

A graduate of Michigan State university, he served as an air force pilot

during World War II. He is now a member of the Society of American Military Engineers and the Union League Club in Chicago.

* * *

International Minerals & Chemical Corporation has announced in Chicago the appointment of two directors and a chemical research manager in its new Research, Engineering and Development Division.

H. Turner Loehr was named director of engineering, and Lawrence A. Roe director of development. Walter Lincoln Hardy will be manager of chemical research. The appointments were announced by Dr. I. M. LeBaron, vice president in charge of the division.

Directors of other departments in the new division are Dr. M. B. Gillis, Research, and Dr. F. C. Kruger, Mining and Exploration.

Loehr will be in charge of all IMC engineering, including construction, plant design, process design, and other staff engineering functions. He will move to headquarters offices in Skokie, Ill. from Florida, where he has been assistant manager of production for the company's phosphate minerals operations.

Roe formerly headed central engineering in the company's engineering division, which was recently combined with the research division. The development program under his direction will bridge the gap between research and engineering, and will include all new process and new product development.

Hardy, for the past two years assistant to the president of Foster D. Snell, Inc., New York, will direct all IMC research on new chemical processes and products.

GILBERT-HODGMAN, INC.

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Members W.S.E. and A.I.E.E.

Reviews of Technical Books



Earth Pressures

Earth Pressures and Retaining Walls by Whitney Clark Huntington, John Wiley & Sons, Inc. New York 1, N.Y. 1957. Pages, 534. Price, \$11.50

This book covers all the common cases and most of the special conditions encountered in retaining wall design. As an introduction background material is covered thoroughly. Formulae are derived and the situations governing the application of Rankine and Coulomb theories are established. The author illustrates the specific types of walls for which each theory is most suited.

For earth pressures on retaining walls due to cohesionless soils the design methods used are the trial wedge, circle of stress, and friction wide methods. The position of the plane of rupture and the total pressure can be determined given the angle of internal friction of the backfill material.

Of particular interest to the design engineer is the discussion of the choice of retaining wall types and possibilities of failures; and the examples of inadequate design methods used in practice for the design of walls with sloping backfills and the design of cantilever walls. The author criticizes the fluid pressure analysis for design of walls with sloping backfills and the usually accepted, but questionable, design procedure for cantilever walls.

Complete examples of design are given for gravity, semi-gravity, cantilever, and counterfort walls. The text is adequately supplemented with more than 200 illustrations.

G.D.W.

Dock Engineering

Dock and Harbour Engineering, by Henry F. Cornick. Charles Griffin and Company, London, England. Volume 1 first published in 1958. Pages 308.

This is the first of four volumes of a new treatise combining the subjects of Brysson Cunningham's textbooks *Dock Engineering* and *Harbour Engineering*. Mr. Cornick—a colleague of Dr. Cunningham in earlier years—has selected and arranged what is of permanent value in those works, and has added four times as much new material accumulated from his own experience of dock and harbour undertakings, or abstracted from professional literature of the leading maritime nations.

The main feature of the treatise—and one especially prominent in the first volume—is the description of existing (and a few earlier) installations, whether of docks and harbours considered in their entirety, or of their component parts and equipment, both from the point of view of construction and operations. Ten folding maps of the installations discussed are also supplied. Ample reference sources are furnished at the end of each chapter. While this treatise is primarily devoted to engineering, the structural aspects of port work

is only a means to an end—the economic dispatch of cargo and the quick turn-round of ships, and that of a dock engineer's knowledge must include a thorough grasp of dock operation and cargo handling. The treatise contains chapters that deal amply with these essentials which are allied to the economic layout of dock transport facilities, storage accommodations, and the employment of modern cargo-handling appliances. The contents of the four volumes are given below.

VOLUME 1 — THE DESIGN OF DOCKS

Chapter 1—Historical and administrative. Chapter 2—General design and layout of docks. Chapter 3—Dock and wharf walls. Chapter 4—Entrances and locks. Chapter 5—Graving docks, floating docks and slipways. Chapter 6—Lock gates and Caissons.

VOLUME 2 — THE DESIGN OF HARBOURS

Chapter 7—Introductory. Chapter 8—Harbour design. Chapter 9—Tides and waves. Chapter 10—Surveying, marine and submarine. Chapter 11—Breakwaters and pier-heads. Chapter 12—Jetties, piers and landing stages. Chapter 13—Entrance Channels. Chapter 14—Channel demarcation, aid to navigation, mooring buoys.

VOLUME 3 — BUILDING AND EQUIPMENT

Chapter 15—Roads, railways and bridges. Chapter 16—Transit sheds, warehouses and other buildings. Chapter 17—Working equipment. Chapter 18—Operation plant. Chapter 19—Bulk handling plant. Chapter 20—Auxiliary services and appliances.

VOLUME 4 — DOCK AND HARBOUR CONSTRUCTION

Chapter 21—Geology and soil mechanics. Chapter 22—Calculations for foundations, dock and wharf walls, and graving docks. Chapter 23—Materials and workmanship. Chapter 24—Constructional plant. Chapter 25—Temporary works for dock, harbour, and breakwater construction. Chapter 26—Organization of works.

This treatise should be of interest to the engineers who are engaged in the Saint Lawrence Seaway Project.

H.H.

Steel Design

Design of Steel Structures by Edwin H. Gaylord, Jr. and Charles N. Gaylord, McGraw-Hill Book Company, New York 36, New York, 1957. Pages, 540. Price, \$8.00.

This book has been written in such a manner that it may be used successfully as a textbook for the usual courses in civil engineering. It presents the subject matter of structural design in a way that will promote understanding of its basic philosophy. The subject matter of the text deals with the design of all types of structural members and their connections. Steel bridges and building frames are covered by both theory and typical examples of practical problems. Also included is the presentation and discussion of the design

Head Protection is Vital Element

Head protection for employees is a vital element of the highly integrated safety program leading to lower accident frequency and severity rates in steel producing operations at the 41 plants of United States Steel Corporation.

Concern for head protection of employees at U. S. Steel is based on the sound logic that even the thickest skull is not compatible in durability with the impact of sharp, heavy objects that fall or are dropped from various heights.

Expand Program

Members of maintenance crews were the first U. S. Steel employees to wear safety hats. Job hazards were recognized as similar to those found in the heavy construction industry where the hats were already in use as standard safety equipment for erecting forces.

Success of the safety hat program with maintenance workers resulted in its extension to personnel in all plant areas where overhead facilities create a potential for "head injury" accidents.

In the majority of the steel corporation's plants it is now mandatory for safety hats to be worn in the blast furnace and open hearth departments. Riggers, boilermakers, structural workers, hookers and loaders of all departments are also required to wear safety hats on the job.

Safety Hats Improved

What about employee acceptance of safety hat measures and regulations? Was—or is—this a problem?

Initially, yes. Considerable salesmanship was required to implement the safety program.

But times have changed—and so have safety hats. Today, there is little or no difficulty experienced in getting personnel to don their safety hats.

Improvements in the hats themselves have played an important part in win-

ning worker acceptance. The Skullgard—made with a reinforced crown of steel wire screen molded into a strong, one-piece plastic laminated unit—is constantly being redesigned by engineers of Mine Safety Appliances Company to provide better protection and wearing comfort.

Prevent Serious Injury

The durability of the modern Skullgard is reflected in its performance in actual accident incidents.

At one of the firm's important steel making plants, an employee in the blast furnace area was hit on his safety hat when corroded bolts sheared off, permitting a 25-pound sheave wheel side plate to fall from a height of some 15 feet. The employee received only small abrasions.

In another instance, a man working with two partners on a downcomer of a blast furnace was hit on his Skullgard by an 18¼-inch long spud wrench that fell from a height of about 55 feet. It hit with enough force to penetrate the man's hat, but the blow was cushioned to the extent that the worker received only a slight laceration.

In an accident that occurred to an employee working just below and adjacent to a steel footbridge, a steel bar fell 12 feet from an unbalanced wheelbarrow. The bar struck a glancing blow on the man's safety hat, softening the impact so that the employee suffered nothing more than a soreness on the right side of his collar bone.

Narrow escapes like these do much to encourage safety hat wear. The worker who escapes with little or no injury because of the protection afforded by his safety hat is quick to recognize the truth of the axiom: "virtue is its own reward."

Other workers, having seen or heard of instances where protective hats pre-

vented serious injury or loss of life, usually accept the hats as a necessary safety precaution.

Posters Promote Safety

To prevent laxity developing in the U. S. Steel safety program, incidents where a Skullgard has proved "the difference" in protecting an employee are noted on accident report forms. The recorded data is converted to use in plant posters and bulletins that remind workers of the value of safety hats and other personal safety equipment.

Nearly every year, the industry sets new and lower frequency and severity rate standards.

In the first six months of 1958, the steel producing operations of U. S. Steel set a 1.08 frequency rate.

Continuous efforts to isolate and eliminate certain hazards are constantly being made at plants of U. S. Steel Corporation. These activities, plus adherence to the sound practice of wearing safety hats and other protective garments in recognized hazard areas, are important factors in the good safety performance recorded by U. S. Steel.

"Air Beam" Elevator

The Czechs claim to have developed the world's first elevator that operates without a cable system. It rides on a pillow of air. According to *Product Engineering*, ventilators are used to create a sufficiently strong air beam under the elevator to press the cage upward.

Sparkler

A new hubcap that sparkles may become as popular as the hula hoop in the automobile world, declares *American Machinist*. The sparkling hubcap is made of fiberglass with a layer of gold and silver glitter just below the transparent surface coating.

Book Reviews (continued)

calculations for several structures previously constructed. The use of aluminum is mentioned briefly because of its increasing use as a structural metal.

There are twelve chapters in this book and are titled as follows: 1. Introduction; 2. Structures, Metals, and Fasteners; 3. Tension Members; 4. Compression Members; 5. Beams; 6. Combined Stresses; 7. Connections; 8. Plate Girders; 9. Industrial Buildings; 10. Steel Bridges; 11. Multistory Buildings; and 12. Introduction to Plastic Design.

This final chapter gives the designer an introduction to this development and an opportunity to appraise the elastic theory as a basis for design.

Each topic is introduced with a discussion of the relevant theory and references to experimental evidence. The relation of theory and tests to standard design specifications is emphasized. There are also adequate references to literature to help the designer who wishes to pursue further some particular topic of interest.

Dear WSE Member:

When inviting your engineer friends to join the Western Society of Engineers, inform them of the following advantages:



84 East Randolph Street, Chicago 1, Illinois, is not only the Headquarters of Western Society of Engineers but a Loop Home for Engineers.



WSE members are welcome to full use of the Society's lounge and dining room with families and friends.



Opportunities for professional growth by educational programs, meetings and field trips.



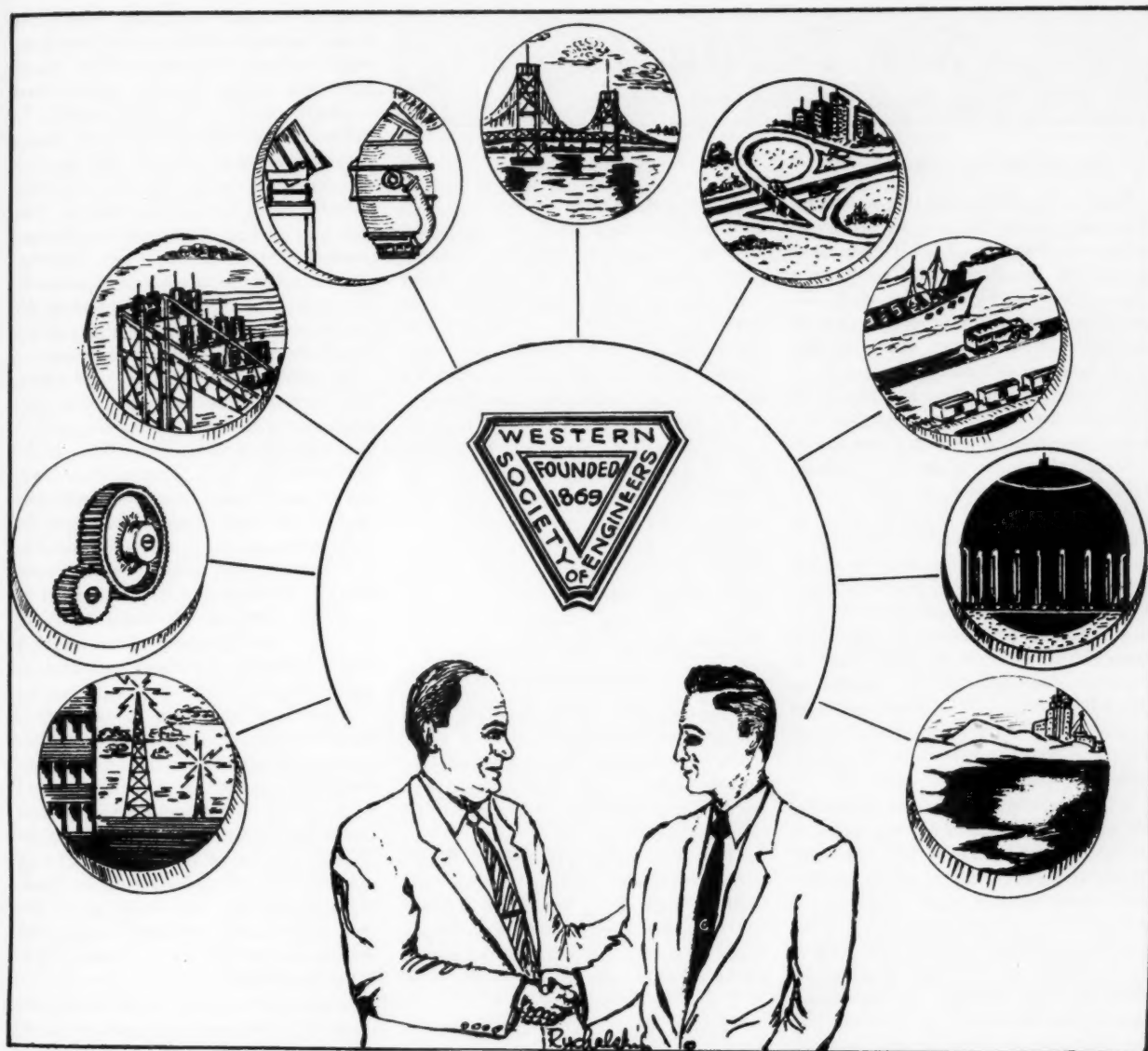
Personal contacts with outstanding engineers, educators and industry leaders.



Professionally and socially broadening discussions with people from all fields of specialization.



Economical advertising through Society's publications.



DEAR WSE MEMBERS: The Society is making preparations to welcome 300 new members. 300 young and experienced engineers from all fields of engineering will join the Society providing we give them the opportunity.

Help your organization to grow!

Help young engineers to grow with it!

Some time ago you received two proposals for WSE membership cards. Do not discard them!

Fill them with the names of men who would be proud to become WSE members and mail today.

New Products

As described by their Manufacturers

Aluminum Tank Transformer

First in the field with this important innovation in transformer construction, is the new Aluminum Tank Transformer announced by Precision Transformer Corp., Chicago. This revolutionary development, the result of a full year of research and experiment, gives the electrical and manufacturing industries a wide range of important benefits available only by housing distribution and power transformers in aluminum tanks.

Since aluminum needs no maintenance, it forever ends the costly labor and inconvenience of painting, chipping and de-rusting conventional steel housings. Exposure to the elements results in oxidation and dulling of the aluminum, which builds up an added protective coating against further weathering. After approximately two years, the rate of weather penetration becomes practically nil. Fifty years of weather exposure produces only about three mills of penetration. Corrosion, therefore, is practically non-existent.

Since aluminum saves two-thirds of the weight of comparable steel tanks, it provides many other savings and advantages: lower shipping costs, smaller installation crews, faster installations and handling at all times. Thanks to aluminum's improved electrical conductance, internal feedback and heating are eliminated. Aluminum's greater efficiency in the grounding of electrical distribution systems reduces the incidence of explosion by short circuit. By also eliminating sparking danger, aluminum provides a vital safety factor against fire. It reflects light and heat—prevents heating of oil and cores. Ribbed construction makes the most of aluminum's inherent strength for maximum overall rigidity in these lightweight housings. Like all other Precision Transformers, these new aluminum tank units are covered by a full five-year guarantee.

The new Precision Aluminum Tank Transformers are available in liquid-filled (oil and Askarel) types for distribution and small power sizes up to 5000 KVA. For full details, photographs and price schedules, write *Midwest Engineer*, Key 101.

Crucible Furnace

A new pot crucible furnace has been announced by the Pilot Plant Equipment Division of Lindberg Engineering Company, Chicago. This furnace is designed for heavy and continuous duty at all heat levels up to 2000°F. (1093°C.). Its versatility as a pot, crucible and retort furnace makes it ideal for a variety of laboratory and pilot plant operations.

The furnace chamber is 8" diameter by 9" deep. The alloy pot dimensions are 6" I.D. by 10½" deep, while the atmosphere retort has a working area of 6" I.D. by 8¼" deep. The furnace is supplied as a complete unit with transformer, heating element, contactor, thermocouple and chamber cover.

For additional information write *Midwest Engineer*, Key 102.

Sintering Media

Manufacturing plants handling small and medium sized parts can now effectively solve many of their costly tumbling process problems with a completely new, scientifically designed type of metal tumbling media.

These new media, produced by a sintering process on which patents are now pending, have been developed and are now being produced at low cost by Dixon Sintaloy, Inc., a subsidiary of the Joseph Dixon Crucible Company, Jersey City, N. J.

Offering unique advantages for deburring, cutting and burnishing, the new sintered media—now available in several

desirable shapes—exhibit up to ten times longer useful life than conventional tumbling media, as extensive tests show. They also permit simpler, standardized production of barrel finished parts.

The Dixon Sintaloy sintered shapes have proved most suitable for meeting the needs of various specific tumbling and barrel finishing operations. The sintering method of manufacture permits precise control of material hardness, shape, porosity and surface characteristics to provide media with the most desirable properties for particular cutting, deburring and finishing applications.

In addition to absolute uniformity, these new tumbling shapes can be impregnated with auxiliary cutting, polishing or finishing compounds, and can be heat-treated as well. They will not powder or break down in use, nor will they clog or lose their cutting characteristics with repeated use. Jamming, loading and discoloring of parts are greatly minimized. Additionally, they can often be used dry without the usual tumbling solutions, and frequently the cleaning stages following tumbling can also be eliminated.

One of the outstanding advantages of the new sintered metal media is the opportunity it offers for standardizing and simplifying production of barrel finished parts. Their exceptional durability eliminates the need to compensate for media breakage and wear during runs, or with successive re-use. As a result, in finishing a given part, the same procedure may be followed on each batch with assurance that finished work will be consistently uniform.

Shapes that are now available include triangles, discs and spurs in a range of sizes, in heat-treated steel and brass alloys suitable for use on a wide variety

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of parts and materials. They will appear on the market under the registered trade names of Sintabur, Sintabrite, Sintahone, Sintacut and Sintacote. A total of 11 different types are now in production, some of which have specially designed serrated "file type" cutting edges on all surfaces. They are currently being supplied in heat-treated steel and in some non-ferrous materials.

According to Kenneth M. Gleszer, president of Dixon Sentaloy, the new sintered-metal tumbling shapes permit a degree of standardization in tumbling operations and a uniformity of results previously unobtainable. They offer management substantial savings by their greater efficiency, finer and more consistent results, and greatly extended useful life, he said.

Pointing out that Dixon Sentaloy's development of sintered-metal shapes was an outcome of the company's efforts to solve its own tumbling troubles with existing materials, Mr. Gleszer stated: "After studying the problem, we concluded that the unique and controllable properties of materials made by the powder metallurgy process might well provide us with the type of material that would eliminate most of the former headaches due to changing characteristics of the material when put in use, and especially the headache of the resulting inordinate amounts of scrap. The results of our initial tests, and follow-up research and development have been most gratifying."

Emphasizing the fact that Dixon Sentaloy is now able to pass the advantages and savings effected through the use of these media to industry in general, Mr. Gleszer added: "From our experience with these materials, we believe that anyone interested in the tumbling process would make no mistake in working with these new materials. The improvement in process stability, reduction in scrap, and extended life of the media, change an art with variable economics into a scientific process having predictable results at lower cost."

Literature

Mounting Hitch

A custom-built mounting hitch for fastening its P-160 Base Paver Attachment to individual tractors is highlighted in a new bulletin available from Blaw-Knox Company, Pittsburgh.

Other features of the attachment, described in the bulletin, include an exclusive oscillating screed, simple depth, width and crown adjustments, and an easy loading hopper that permits spreading stone, slag, gravel, soil or Pugmill mix aggregates over 400 tons per hour.

The bulletin—No. 2635—may be obtained by writing Blaw-Knox Company, Construction Equipment, 300 Sixth Avenue, Pittsburgh 22, Pa.

Valve Data Sheets

The first of a regular series of valve Application Data Sheets is now available from Koehler Aircraft Products Company, Dayton, Ohio.

The initial issue of "Fluid Facts" features KOEHLER/Dayton Valves that are available for the handling of LOX and other cryogenics.

Blade and ball type designs types are illustrated and basic features, functions operating characteristics and specifications of these valves are discussed in detail.

To receive copies of these Application Data Sheets regularly, write Sales Promotion Dept. Koehler Aircraft Products Company, 409 Leo Street, Dayton, Ohio.

4-D Wrought Iron

A new 64-page booklet, "4-D Wrought Iron for Building Drainage Systems," provides architects, engineers, building owners, contractors and maintenance supervisors with a comprehensive discussion on piping for soil, waste, vent and downspout applications. The booklet was prepared by A. M. Byers Company, Pittsburgh, world's largest producer of 4-D wrought iron products.

Contents are divided into nine sections. First among these are reports of

building piping surveys conducted by independent engineers in New York and Chicago. Results of these surveys are accompanied by photographic examples of vent corrosion.

Included among the other sections are descriptions of the corrosive conditions encountered in drainage services, comparative service records, Durham versus Bell-and-Spigot systems, typical installation and performance tables.

Piping economy is discussed and cost comparisons between low maintenance and low-initial-cost materials are graphically illustrated. Specifying and tabular reference data for both 4-D wrought iron pipe and nipples are also included.

Copies may be obtained by writing A. M. Byers Company, P. O. Box 1076, Pittsburgh 30, Pa.

Temperature Controls

A four-page folder describing its new line of Pneumatic Temperature Controls has been issued by the Partlow Corporation of New Hartford, New York, according to a recent announcement. The folder introduces the Model RVA, recording pneumatic temperature control, and Model IVA, indicating pneumatic temperature control.

The instruments constitute a simple, rugged method of controlling a wide variety of heating appliances, while at the same time providing temperature indication or recording, it is stated. They operate in any of ten optional temperature ranges from —30 degrees to 1100 degrees Fahrenheit.

Especially suitable for operation where steam is used as the heating medium, the pneumatic systems are completely self-contained and use no electricity. Being explosion-proof, the controls may be used in any hazardous location.

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According to the folder, when coupled into an air system the controls actuate an air-operated valve controlling the flow of steam, water or gas, or control other air-operated devices.

The wide, high-visibility scale in Model IVA permits easy reading, a factor especially important in locations where the instrument must be installed at some distance from the work area. Model RVA provides both temperature control and a minute-by-minute record of temperatures.

Interchangeable elements are another important feature of the pneumatic controls, the folder concludes. Both the IVA and the RVA operate on an air pressure of 3 to 15 psi.

For your copy of the folder, write to the Partlow Corporation, 509 Campion Road, New Hartford, New York.

Highway Glossary

A revised edition of "The Right Word," a glossary of highway terms, has been published by the National Highway Users Conference, it has been announced in Washington, D. C.

Requests for the original edition of the handy reference booklet were so heavy that the supply was exhausted. The current edition contains additional definitions which have come into recent use as a result of fast-moving highway developments.

In a forward to the new edition, Arthur C. Butler, NHUC Director, states: "Just as scientific advances have increased and changed the average man's vocabulary, so the tremendous development of the nation's highway systems is bringing with it new words, new meanings, and more general significance to many technical terms."

He added that since "The Right Word" was first published two years ago, "events and word usages have been moving rapidly." The decision to revise and reissue the publication, he said, is part of NHUC's continuing effort to encourage public understanding and interest in highway development."

Free single copies and prices for quantity orders may be obtained from the National Highway Users Conference, 966 National Press Building, Washington 4, D. C.

Steam Metering

"Accurate Steam Metering for 1—1½" Lines" is the title of a new, highly

informative eight page bulletin issued by Builders-Providence, Inc., a division of B-I-F Industries, Inc., Providence, R. I. The time-honored Shuntflo Meter, Model SMDH, for the precise metering of steam in 1—1½" lines, has been simplified for more efficient replacement of orifice plates to change capacity.

The two-color bulletin is profusely illustrated with photographs, cross sectional views, dimensional drawings, capacity and accuracy tables. It describes features, operation, installation and specifications of the improved meter, designated as Model SMDH Style 57. The last page illustrates a few of the many Shuntflo Meter accessories designed for both Model SMDH for steam, and for the larger capacity Model SMKS Shuntflo Meter for steam, air, and gases, including sewage digester gases.

Accuracy of Model SMDH Shuntflo Meter is within +2 percent of actual flow. The unit is self-contained and self-operated, has a direct reading totalizer and a record for exceptionally low maintenance.

For your free copy of Bulletin 400-P25 write to Builders-Providence, Division, B-I-F Industries, Inc., 345 Harris Avenue, Providence, Rhode Island.

Concreting

An eight-page pamphlet entitled "Year Round Concreting" summarizes the new American Concrete Institute's standard recommendations for cold weather concreting. It tells how calcium chloride and other developments aid in placing durable, quality concrete in cold weather.

The publication includes sections on accelerators, preparation before concreting, winter concreting objectives, and protection required. A two-page chart illustrates data on effect of 2% calcium

chloride at temperatures of 73, 55, 40 and 25 F, on Type 1 and Type 3 cement.

Guide specifications, prepared by the Calcium Chloride Institute, are included for architects and consulting engineers.

Copies of "Year Round Concreting—A.I.A. File No. 3-B-2," are available immediately on request to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Rigid Urethane Foam

The latest formulations and requirements for foamed-in-place applications of rigid urethane foam in boats, building construction and thermal insulation are described in a new six-page booklet issued by Allied Chemical's National Aniline Division.

The brochure explains foamed-in-place uses of closed-cell rigid urethane foams in flotation chambers of boats, sandwich construction building panels, thermal insulation for vans, reinforced equipment parts, radomes for aircraft and guided missiles and numerous other structural parts.

Unicellular foams are produced from Nacconate 1080-H and have excellent adhesion to most supporting surfaces when poured in place. As a result, they do not require a separate bonding agent when employed as a core material, the booklet points out.

The technical data sheet, based on National Aniline research, lists formulations, storage requirements, heat and humidity aging properties and methods of pouring and curing of polyester-based rigid urethane foam.

Copies of the bulletin may be obtained by writing Chemical Sales, National Aniline Division, 40 Rector St., New York 6, N. Y.

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Etkes Says Airports Not Ready

Americans may be ready for the Jet Age, but their airports definitely are not.

Within a year, fleets of jet transports will be ready for both overseas and domestic passenger service. But, says Perry W. Etkes, a consulting engineer, of New York, this country's airports will be still in the prop era.

Failure of the Civil Aeronautics Authority to avail itself of the wealth of knowledge on jet operations that the military developed during and since World War Two is the major reason that our airports will not be ready to handle jet aircraft, Etkes said.

The major way to solve the situation, he suggested, was close and immediate coordination between civilian and military agencies.

Mr. Etkes listed four basic problems that face airport administrators who plan jet operations:

- Building runways, taxiways and parking pads able to withstand heavy jet loads;

- Building safe approach and landing strips;

- Controlling jet noise, and

- Providing adequate facilities for servicing and handling of passengers and freight.

All these problems, Etkes said, must be licked before the nation can enjoy the benefits of jet air travel.

Mr. Etkes' viewpoint is based on experience gained in construction of jet aircraft bases for the U. S. armed forces. He most recently was chief engineer at the largest Strategic Air Command base in Morocco.

In explaining the difficulties confronting the United States in building commercial jet ports, Etkes described the most critical problems as runways in existing airports. Most are too short to handle the fast-moving jets, he said. Too, their pavements are too thin to support the jets' heavy weight.

Beefing up the pavements is a complex job, Etkes suggested. "Even sub-soil conditions must be studied carefully to gauge possible settling of the pavement under the heavy jet loads," he said.

Because of the jets' high landing speeds, they need perfectly smooth runways to forestall accidents. They need wider and stabilized shoulders along the runways, longer overruns, and blast-pad provisions, among other things.

The approach angle and clear area around airports, inadequate at present, will have to be revised considerably due to the jets' increased speed, the engineer said. For one reason: There will exist a serious problem in "stacking up" in bad weather, for jets burn fuel rapidly.

Excessive jet noise too is a serious problem. New jets will be equipped with noise suppressors, but they reduce thrust, add drag, and increase fuel costs by about five per cent. On the ground, the jets' whine, even reduced by suppressors, will still need to be quieted further with blast walls strategically located around loading areas, Etkes said.

The servicing of 300,000-pound jets, Etkes noted, is quite another problem from servicing lighter piston-driven craft. Just moving them about when the pavement is wet or icy presents a problem, he said. Present tractors are not suitable, he said. Too, jets require underground fuel hydrants capable of loading the planes' fuel tanks at the rate of 2,000 gallons a minute, for efficient airport operations. Such hydrants do not exist in our most modern civilian ports. Repairs and engine adjustments also require new facilities.

All of the time that is saved in the air, Etkes warned, can be quickly lost on the ground in the jet age—if the airport problems are not faced, and conquered, today, before the big jet fleets are put into service.

Strange Bedfellows

Dam-building can make strange bedfellows, reports *Engineering News-Record*. The Great Northern Railway

is sharing one of its tunnels temporarily with highway traffic past the Rocky Reach Dam construction site on the Columbia River in Washington. This will go on until both railroad and highway are rerouted above the future reservoir level.

Two Societies Vote To Merge

Members of the two Societies have voted for the merger of the American Society of Heating and Air-Conditioning Engineers and the American Society of Refrigerating Engineers.

This was announced by ASHAE President E. R. Queer, University Park, Pa. and ASRE President Cecil Boling, W. Hartford, Conn. in a joint statement following completion of balloting on Dec. 2 at a Special Meeting of ASHAE in Chicago, Ill. and at the ASRE Semi-Annual Meeting in New Orleans, La.

The consolidated Society will be named the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

Each Society recorded a high total number of ballots with 93 percent of ASHAE and 73 percent of ASRE voting for the merger. The ASHAE ballots totaled 5712 with 5307 favoring and 405 opposing the merger. The ASRE members voted 3516 for and 1293 against the merger with a total of 4809 ballots.

According to Queer and Boling a two-third majority of the total vote was required to approve the merger, and this expression by the members of the two Societies followed a long period of exploration, explanation and discussion.

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Salt Fights Winter's Snow-Ice

More than 2,000,000 tons of salt—enough to fill a giant salt shaker two-and-a-half times the size of the Empire State Building—will be spread on the nation's streets and highways to remove this winter's snow and ice.

This record tonnage will be used by 38 state highway departments and by a preponderance of the major cities located in the nation's snow belt, according to the Salt Institute, Chicago.

The information is reported by the Institute in a new publication, "Salt for Ice and Snow Removal—the Facts About Public Safety and Automotive Corrosion" which has just been released for distribution.

Scope of salt's use as a de-icing chemical by cities in the nation's snow belt includes:

100 per cent of the 33 major cities with populations of 200,000 upward.

91 per cent of the 121 cities with populations ranging between 100,000 and 200,000.

75 per cent of the 186 cities in the 25,000 to 50,000 population range.

Rising yearly volume of de-icing salt is attributed to an expanding list of users, combined with growing acceptance for the advanced method of bare pavement maintenance.

In this snow-fighting plan, salt is spread at the first storm warning to melt snow as it falls and to prevent bonding of snow and ice with the pavement. During sustained snowfalls, spreading of salt is alternated with plowing to break up packed ice and snow, and also to prevent the icy residue left in the wake of a plow from freezing into a dangerous, slippery coating.

The new booklet emphasizes public safety as the "paramount consideration" in ice and snow removal programs, with side benefits accruing to business and industry as well as to motorists.

"There are dramatic examples of salt's efficiency in skid-proofing pavements in winter," the booklet states. It cites the drastic drop in skidding accidents in New York City after salt was adopted. In a six year period from 1930 to 1936, before salt was used for ice and snow removal, the city had a yearly toll of 21 deaths and 1,635 personal injuries attributable to skidding accidents. In a ten-year period after the city employed salt, the annual average toll

from skidding accidents dropped to nine deaths and 736 personal injuries.

One chapter in the booklet measures the increased public safety inherent in efficient snow removal programs against public complaints that de-icing chemicals are corrosive.

"Tests have shown that cars corrode standing in a garage in springtime," the booklet states.

Factors which speed corrosion include: Extreme temperatures to which a car is subjected, ranging from sub-zero in winter to upwards of 150 degrees in direct summer sunlight; humidity caused when a hot motor is driven into a cool garage; dissolved industrial gases, such as sulfur dioxide, nitric oxide and hydrogen, which give moisture in the air a corrosive degree of acidity; rain water which is saturated with oxygen and highly corrosive; and the blasting effect of sand, gravel or cinders.

"The first responsibility of street and highway engineers is to promote safety and protect life," the booklet concludes. "The prudent car owner accepts the responsibility for protecting his car against corrosion . . . Unfortunately, many pieces of household furnishings and equipment that cost much less than an automobile receive far more care and attention than the average car."

EJC Cites CIT And Westinghouse

Engineers Joint Council, representing 300,000 of the nation's engineers, on Jan. 16 cited the Westinghouse Educational Foundation and the Carnegie Institute of Technology for pioneering the encouragement of young men and women to seek careers in engineering and science. The Citation was formally presented by Enoch R. Needles, president of EJC, to John A. Hutcheson, vice-president in charge of research and development for Westinghouse Electric Company and president of the Westinghouse Educational Foundation.

The presentation took place at a luncheon meeting of the Board of Directors of Engineers Joint Council in the Terrace Suite of the Hotel Roosevelt in New York City.

This year observes the completion of 20 years of George Westinghouse Scho-

larships at Carnegie Tech. Each year, since 1938, ten four-year scholarships have been awarded to secondary school seniors selected from over 1000 applicants per year, in nationwide competition. The program represents a pioneering achievement in industry-education cooperation.

In presenting the Citation in the presence of EJC's Board of Directors, President Needles said "it is particularly fitting at a time when our nation faces increased responsibilities in its technological progress that Engineers Joint Council recognize two of the leading organizations which, over the past two decades, have helped to supply our educational institutions,

Chicago Concern Completes Pipe Plant

A highly automated plant with newly developed equipment for the manufacture of cast iron pipe has been completed in suburban Chicago for James B. Clow & Sons Inc., it has been announced in Bensenville, Ill. by the Leonard Construction Company, general contractor.

Built and equipped at a cost of \$6,500,000, the new facility has more than 100,000 square feet of enclosed floor space and occupies approximately 60 acres. It will be used for the manufacture of cast iron pressure pipe of 6- to 16-inch diameter, in 18-foot lengths, by the metal mold process.

Leonard was employed as engineer and builder for the project. The firm was responsible for preparation of all plans and drawings for buildings, for the assembly of equipment, the preparation of site development, construction of buildings and machinery installation.

The site for the new plant was taken over as a farm. Leonard planned and installed railroad sidings, including a mile of siding on the site alone, as well as planning and installing roads, electric service, sewer and water supplies, and fire protection facilities.

The main building of the plant is 400 feet long and 2 to 2½ stories high. It houses the cupolas for melting iron, the centrifugal casting machines, core-making equipment and maintenance and machine shops. Projecting from this building is a one-story structure, 440 feet long, in which pipe is annealed, tested and coated.

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Wire Rope to Help Raise Span

More than a mile of one and three-quarter inch pre-stressed wire rope will be used to raise the span of the new lift bridge now under construction across the south channel of the Soo locks for the Canadian Pacific, Soo Line and the Duluth South Shore and Atlantic railroad companies.

The span, now under construction piggy-back fashion atop the old swing span that carries railroad traffic across the channel, will weigh about 800 tons.

But lifting the 395-foot section will not be the Herculean task it might seem. Four huge counterweights installed in the bridge towers will balance the weight of the lift span.

Twelve lengths of wire rope, each some 186 feet long, will connect each of the four counterweights to the four corners of the span. The wire ropes run across huge sheaves, which are more than 17 feet in diameter and are located atop the 153-foot supporting towers.

The wire rope was manufactured and fabricated to exact lengths at the Trenton, N.J., plant of U. S. Steel's American Steel and Wire Division and then shipped to the bridge site.

Early in March the span section of the bridge will be completed and the wire rope attached to the span and counterweights. Then engineers will begin the delicate job of balancing so that the total weight of the counterweights equals that of the span.

Thus, the work of the two 100-horsepower electric motors, one on each tower, will mainly be that of overcoming the inertia of the span and counterweights and friction in the moving parts.

Each of the four counterweights operating along the sides of the bridge towers will weigh approximately 200 tons. They are steel boxes measuring 26 by 6 by 14½ feet and are to be filled with concrete. The Industrial Construction Company of Minneapolis has men at the bridge site now to fill the counterweights with reinforced concrete. The final balancing will be accomplished by adding additional blocks of precast concrete weights.

The main motors will raise the span 108 feet in one and a half minutes. Emergency 50-horsepower electric motors can raise the span in four and three-quarter minutes.

American Bridge Division steelworkers have nearly completed the two supporting towers and are rapidly extending the span across the channel. Work on the span was started at the center of and just atop the swing span. Despite sub-zero temperatures during much of December and some of January, the steelwork is slightly ahead of schedule and the major part of the erection will be finished by early spring.

However, the old swing span will be used during the early part of the 1959 shipping season while mechanical work is completed. The lift span is scheduled to be put into operation in August.

Then the old bridge will be dismantled. The final job, to be undertaken next year, will be removal of the island which supports the swing span. The island is considered a hazard to navigation and was one of the reasons for construction of the new lift span.

Material of Antiquity, Brick, is Modernized

One of the mankind's earliest building materials, bricks made out of clay, has been modernized and streamlined to handle some of the toughest jobs in modern industry, according to a paper delivered on Dec. 4 at the annual meeting of The American Society of Mechanical Engineers in New York.

Bricks made, not of natural clay, but of man-made minerals such as silicon carbide, aluminum oxide, and mullite, are resisting acids in industrial plants, withstanding the pounding of 2800 tons of sliding coke each day and taking on other chores too rough for even the best metal alloys.

The paper, written by Roy W. Brown of the Carburundum Company, Perth Amboy, New Jersey, described a class of materials known technically as inorganic non-metallics, but called by engineers, "super refractories." Many of these materials, were originally developed to serve as refractory (heat resistant) linings in blast furnaces and similar hot spots. Now, however, new uses are being found.

One group of these super refractories, said Brown, can be melted in an electric furnace and poured into a mold of the desired shape, in the same way that

molten metals are cast. This process permits the manufacture of such items as pipe, rollers, and other shapes.

A typical application of the man-made materials noted by the author was in the form of a roller submerged in a bath of molten aluminum to hold down strands of wire being pulled through the bath. Cast iron rollers dissolved and contaminated the aluminum within a matter of a few hours, while silicon carbide rolls lasted for three to six weeks.

Advantages of using super refractories in rocket nozzles, where they would be exposed to sudden changes of temperature and corrosive gases were also noted.

Silicon Rectifiers to Have Higher Ratings

Silicon-controlled rectifiers "with significantly higher current ratings will be available in the near future" and will find wide use in power control applications because of small size, light weight and power increase characteristics.

So said three General Electric Company engineers on Feb. 4 in a paper presented at the Winter General Meeting of the American Institute of Electrical Engineers in the Hotel Statler Hilton. The paper, "The Controlled Rectifier in Power Control Applications," was authored by W. D. Cockrell, Waynesboro, Pa., C. S. Walker, Lynchburg, Va., and J. D. Harnden, Schenectady, N. Y.

"The controlled rectifier," they said, "is a silicon device utilizing some of the properties of transistors and rectifiers to produce a new control component somewhat analogous to the thyatron." They exhibit two methods of control, anode-cathode breakdown and gate control, with the latter method "far more useful for power applications since appreciable power gain is realized." For the commercially available silicon rectifiers "the power gain is in excess of 150,000 watts per watt, with response times in the micro second region."

From a circuit viewpoint, the rectifier "is a switch which is either open or closed. Thus, conventional techniques, such as phase control, pulse width modulation, and time base modulation, must be utilized to achieve variable power flow."

They said "a considerable saving in space and weight may be made by substituting" the silicon rectifier for the self-saturating magnetic amplifier.

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Engr. Must have good personality & appearance. U.S. Citizen for a mfg. of portable elect. tools, sal. \$7800 loc. W. Chgo. Suburb, employer will pay the fee. C-7255 INDUSTRIAL ENGR. Some college; age 30-50; 10 yrs. exper.—5 yrs. training or related exper.; 5 yrs. indust. engrg. or mgmt. Duties: Develop & conduct train of shop supvs. & operating personnel sal. \$7/8500 loc. No. Ill., employer will negotiate the fee. C-7256 (A) PROJECT ENGR. age to 45; To supv. product devel. of appliances such as vacuum cleaners, waxers, oil burners & toasters. sal. \$10/12,000 (B) ASST. PROJECT ENGR. to work on vacuum cleaner devel. sal. \$6/8,000 (C) PROJECT ENGR. exper. in metal furniture or allied products involving stampings, tubes & plywood such as office eqpt., metal cabinets or similar fabricated products sal. \$7/9,000 (D) PROJECT ENGRS. small assemblies EE or ME sal. to \$7800, must be U.S. Citizens, loc. Ill., employer will pay the fee. C-7266 PROJECT ENGR. Grad. Mech. age 30+; 3+ yrs. exper. in design of trailers or related eqpt. Duties: At project engr. level to design trailers. Must have good supervisory ability to oversee others. New plant which will empl. abt. 600 & have an engrg. dept. of abt. 25 sal. \$7200/10,000 loc. No. Ind. C-7267A ELECTRONICS ENGR. BSEE: 5+ yrs. exper. Resp. for organizing & setting up electronic type lab. to devel. certain special products in the field of instrumentation & control. Resp. for empl. & supv. model makers & techs. Should be familiar enough with sheet metal shops & electronics labs to specify type of eqpt. req'd. To design simple electronic devices such as magnetic am-

plifiers, regulators, some elect. alarm circuits, etc. Provide consultation to design groups in field of regulators & controls for rotating mach'y; particularly as it is applicable to aircraft & missile range, sal. \$10/12,000 loc. So. Wis., employer will pay the fee. C-7267B DESIGNER-ELECTRONIC CIRCUITS BSEE: 8+ yrs. in electronic circuit design with recent exper. in transistor application as it pertains to transistor power supplies & digital techniques, perhaps in the numerical machine tool line or data processing field sal. \$10/12,000 loc. So. Wis. Employer will pay the fee.

Engineers Available

925:MW- STRUCTURAL DESIGN 27 BSCE; 3 yrs. exper. in construction dept. of large firm. Have worked with steel, reinforced concrete & wood. Have designed both simple & complex structures from roof to foundations \$7,000 Midwest. 922:MW-DIRECTOR OF ENGRG. 60 BSME 25 yrs. exper. as Director of Engrg., Chief Engr. Administrative Engr. in charge of design R & D Lab. Chief sales engr. \$12,000 Midwest or E. 921:MW MECH. ENGR. DESIGN & DEVEL. or MACHINE DESIGN 46 BSME; 26 yrs. progressive exper. from apprentice tool maker-machine design-chief tool designer-production engr. Chief production engr.-mgr. subcontracting-engrg. mgr.-research & devel. Available June 1, \$15,000. 918:MW- (female) ESTIMATOR-EXPEDITOR or TECH. WRITER BS-Engr. Math. with add'l. courses in steel design; 5 yrs. w/general contractor-Detroit; additional yrs. w/gen. contractor-Chgo. most recent 3 yrs. w/large steel fabricator in Chgo. area; to \$6500 Chgo.

The Russians and Instrumentation

What are the Russians doing in the field of instrumentation? How much do we really know about their activities, their scientific achievements?

The answers are now available through authoritative English cover-to-cover translations of four leading Soviet journals. Sponsored by the Instrument Society of America under a grant-in-aid from the National Science Foundation, the ISA "Soviet Instrumentation and Control Translation Series" is the continuation of a program initiated last year by the Massachusetts Institute of Technology. Undertaken as a service to American science and industry it affords an excellent means for U.S. scientists and engineers to become better informed of the latest developments in the field of Soviet instrumentation. It also corrects a situation whereby Russians for many years have been translating scientific English literature while the United States has received much of its knowledge of Soviet activities by word of mouth or through more startling channels such as the launching of satellites. (As a case in point details on the Sputnik prior to its launching were published in Soviet journals and yet few were aware of this vital information.)

The four translated publications include the important Soviet journals *Measurement Techniques* (Izmeritel' nava Tekhnika), *Instruments and Experimental Techniques* (Pribory i Tekhnika Eksperimenta), *Automation and Remote Control* (Avtomatika i Telemekhanika) and *Industrial Laboratory* (Zavodskaya Laboratoriya). All are available through the Instrument Society of America at a very low subscription rate ranging in price from \$20.00 to \$35.00 per annual subscription. Special rates are offered libraries of non-profit academic institutions and for a combined order to all four journals.

The Russian original of *Measurement Techniques* is published bi-monthly by the Committee of Standards Measures and Measuring Instruments of the Council of Ministers, U.S.S.R. There are approximately 800 pages per year with articles of particular interest to all who are engaged in the study and application of fundamental measurement.

Instruments and Experimental Techniques is published bi-monthly by the

Academy of Sciences, U.S.S.R. Over 930 pages per year deal with articles on function, construction, application and operation of instruments in various fields of experimental physics.

The Russian monthly *Automation and Remote Control* is published by the Institute of Automation and Remote Control of the Academy of Science, U.S.S.R. with approximately 100 pages per issue. It is considered to be the leading Soviet journal in the automatic control field and contains articles on all phases of automatic control theories and techniques.

Industrial Laboratory is published by the Ministry of Light Metals, U.S.S.R. This monthly contains articles on instrumentation for analytical chemistry and physical and mechanical methods of material research and testing. There are approximately 1500 pages per year.

Additional information on Russian journals is available from Instrument Society of America, 313 Sixth Avenue, Pittsburgh 22, Pa.

Petroleum Resin and Asphalt Incorporated

Epon Resin, the versatile petroleum-derived resin perfected by Shell Development Company, has been incorporated with asphalt to create a new super-tough paving concrete.

Shell Oil Company engineers are highly enthusiastic over the possibilities of the new material. Its toughness and resistance to wear make it a natural for road and highway resurfacing where heavy traffic is encountered. Because of its high strength and resilience, the thickness of paving needed for new highway construction can be materially reduced, according to Shell.

Another important use foreseen is for warehouse floors where extreme loads from hard rubber or steel tires of fork-lift loaders damage ordinary asphalt or cement surfaces.

The first commercial application of Epon Resin Asphalt Concrete was made in December, 1958 at San Francisco International Airport to meet pavement problems created by jet aircraft. Three and one-half acres of conventional asphalt surrounding United Air Lines' new jet maintenance base were paved with a half-inch overlay.

The new plastic and asphalt paving is a boon to aviation because it will withstand high temperature blasts from jet engine exhausts. It is resistant to solvent action from spilled jet fuel, gasoline, hydraulic fluids and cleaning solvents and it will not deform or pull loose under extreme loads imposed by new super passenger planes and bombers.

Epon Resin Asphalt Concrete is strong and resilient. Shell Development scientists have shown by laboratory and field tests that new pavement combines the superior flexibility of asphalt and the strength of concrete. During comparative tests, a beam deflected a half inch before breaking at 159 pounds pressure. Conventional asphalt deflected a half inch and failed at 15 pounds. Given the same test, the more brittle Portland cement concrete deflected only 2/100ths of an inch, failing at 225 pounds.

Under another laboratory test the new paving withstood for hours exposure to heat of 600°F. Its low permeability which resists solvent action also permits repeated cleansing with detergents. Test strips that have been doused daily with oil and jet fuel show no effect from numerous weekly scrubblings.

According to Shell engineers, the new paving is conventional asphalt with Epon resin and a plasticizer added.

Before making the material available to United's San Francisco base, Shell put it through exhaustive field tests. A strip under a truck loading rack at the company's San Francisco bulk plant has been subjected to continuous pounding from heavy trucks for 15 months. During that time, it has been exposed to frequent gasoline and solvent spills. It has been almost continuously wet with lube oil and yet has shown no failure.

Another strip in a Shell service station, also down 15 months, shows no sign of damage or indentation even though station attendants have raised automobiles on this surface with steel-wheeled jacks.

Eye Opener

Every year, in opening food for the American table, can openers cut half a million miles of tinplate—a distance to the moon and back, reveals *Food Engineering*.

WSE Applications

In accordance with Article I, Section 5 of the By-Laws of the Western Society of Engineers, there is published below a list of applicants for admission received since the last issue of the Midwest Engineer magazine.

Henry C. Curcio, Jr., Engineer, Northern Illinois Gas Co., 615 Eastern Av., Bellwood, Ill.

Richard B. Archie, Field Engineer, Inland Steel Co., Harbor Works, East Chicago, Ind.

Donald C. Kirk, Designer-Estimator, American Bridge Div., U. S. S. Corp., 208 S. LaSalle St.

Otis L. Dodge, Div. Plant Supt., American Telephone & Telegraph Co., 20 N. Wacker Dr.

Philip V. DelMastro, Field Engineer, Northern Illinois Gas Co., James & Ann Sts., Blue Island, Ill.

Harold Sandberg, Structural Engineer, Alfred Benesch & Associates, 10 S. Wabash Av.

Jet Airplanes to Create Problems

Jet airplanes, for some airlines at least, may introduce more problems than they solve, according to an English engineer speaking on Dec. 3 at the annual meeting of The American Society of Mechanical Engineers at the Hotel Statler-Hilton.

As a result, he implied, the new family of turbo-props—propeller driven planes powered by gas turbine engines—will be with us for many years to come.

Citing the comparative speeds and operating costs of pure jets versus turbo-props, D. J. Lambert of Vickers Armstrong Aircraft Ltd., Weybridge, England, pointed out that while it would cost some \$7 per minute to keep a pure jet circling above an airport waiting its turn to land, a comparable turbo-prop would cost only \$4 per minute. An airline using a fleet of 20 pure jets, which experienced an average of four minutes of delay and a traffic pattern adding ten miles to the flight distance, would find costs running over \$2 million per year higher than those of a competitor using turbo-props. "By present standards this would be a very respectable profit for a medium sized airline, except that it hap-

pens to be cost, not revenue," Mr. Lambert said.

Mr. Lambert, who spoke at a session sponsored by the Aviation Division of ASME, incorporated his remarks on economics into a paper describing engineering details of the Vickers Vanguard, a larger successor to the Vickers Vicount, which is now in use on airlines around the world, including several in the United States.

As for the relative speeds of pure jets and turbo-props, Mr. Lambert said, "A pure jet may suffer either through waiting until a suitable altitude is clear or through being forced to make a detour to climb to, or descend from, its assigned altitude clear of other traffic. This delay does not have to be very long to allow the turbo-prop to be speed-competitive. This factor will become of greater importance as the number of pure jets in the pattern increases with little prospect of significant lessening of the congestion in the crowded 10,000-25,000 feet altitude bands. Even today some 10 per cent of the flights in and out of London Airport are delayed for air traffic reasons at least 5 minutes beyond the average ground or approach time. The congestion at London Airport is far less than at the New York termini and the American reader or air traveller is better qualified than the U.K. writer to comment on the adverse delay ratio there."

The relative advantage of turbo-props increase on short flights, said the author, pointing out that only about one quarter of all air travellers fly more than 1000 miles while about half travel less than 500 miles.

1960 Automobile May Run Without Grease

Cars that don't have to be greased are in sight for 1960.

American Metal Products Company of Detroit has announced development of Fiberglide non-lubricated lifetime fabric bearings scheduled to be produced for use on at least one 1960 automobile.

"Complete elimination of grease fittings—a long sought goal of automotive engineers—will be made possible by AMP's new automotive bearings which make possible maintenance-free automotive steering and suspension," said Frederick C. Matthaei, Jr., vice president of engineering and research. "This means considerable savings on lubrica-

tion for the motorist as well as smoother riding and easier handling as a result of the self-lubricating qualities of the new bearings."

Matthaei said first use of AMP's bearings has been on jet aircraft where, although the bearings cost up to ten times the cost of conventional bearings, considerable savings were effected by reducing downtime for maintenance. Use has shown that the fabric bearings have a life of up to ten times that of metal-to-metal lubricated bearings, he said.

Mass production techniques using special equipment developed by AMP have brought the cost of the new bearing down to that of present conventional bearings.

Manufacture of AMP's Fiberglide bearings was made possible by the development of polytetrafluoroethylene fiber. Originated by DuPont and named "Teflon" this fiber is one of the slipperiest materials known and has the lowest coefficient of friction of any fiber.

In its automotive application the Fiberglide bearing consists of a perfectly spherical ball stud around which a woven Teflon fiber socket is molded on assembly into a metal housing. The high load carrying ability of Teflon fibers, plus the perfect confirmation obtained through molding on assembly, gives long, trouble-free life to this bearing.

Engineering research shows that in present automotive suspension and steering systems where lubricated bearings are used, much of the lubricant is pressed out of the bearing after a few hundred miles of driving, increasing friction and wear on the bearing surfaces. New car handling is maintained with AMP's Fiberglide bearings because they cannot lose their self-lubricating qualities through heavy use. Road tests show they are not harmed by the dust, mud or slush bombardment which attacks the underside of a car in motion.

Fingerprint Spray

A new spray for "lifting" latent fingerprints has just been brought on to the market, reports *Chemical Week*. The quick-drying spray is said to produce more sharply defined reproductions of latent fingerprints than other methods presently used. Originally, the new product was developed to improve methods of battlefield identification of casualties. It now will help policemen catch thieves.

Plastic Shows Great Possibilities

"The future of the newly developed polypropylene high temperature plastic shows unlimited possibilities and varied uses in American industry," according to Dr. J. A. Neumann, president and director of research of the American Agile Corp., Maple Heights, Ohio.

Agile is the first company to offer fabricated products of the new material on an industry wide basis.

In a recent interview, Dr. Neumann disclosed "that we have already found from our customers' experiences, plus our own continued laboratory tests and research that the new material can be used in a variety of applications where heat, chemical and stress cracking resistance are major operating requirements."

He pointed out that the most outstanding property of polypropylene is its exceptional resistance to heat. Melting point of this plastic is over 300 degrees F. and it has a Vicat softening point greater than 185 degrees.

Dr. Neumann emphasized that this made it possible for parts manufactured from polypropylene to be sterilized in either boiling water or steam since the material behaves as a crystalline solid even at temperatures in excess of 212 degrees.

He reported that American Agile has conducted exhaustive laboratory endurance tests with stressed polypropylene specimens in steam. "They have shown no signs of failure after over 4000 hours of continuous exposure."

The American Agile chief executive pointed out several characteristics of the new plastic. "In the absence of external stresses, formed polypropylene parts do not change their shape even when subjected to temperatures up to 300 degrees. When operating under normal load stress conditions temperatures as high as 240 degrees can easily be tolerated."

"In addition," he continued, "this new plastic is specifically compounded to provide proper stabilization of the polymer to thermal embrittlement on continuous exposure at elevated temperatures."

While Dr. Neumann emphasized the heat resistance of polypropylene he also stressed that another important characteristic of the plastic is its molecular structure which "offers exciting possibilities when used to combat notorious

stress crackers and corrosive chemicals."

"In Agile testing laboratories the polypropylene samples have been tested against a variety of reagents: concentrated nitric acid, ethylene glycol, dioxane, methanol, distilled water, concentrated ammonium hydroxide, ammonia detergent, motor oil, chrome plating solution, aqua regia and mixtures of nitric and hydrofluoric acids.

"From the various data collected in these series of tests polypropylene appears to have considerably better chemical and stress crack resistance than most other weldable plastics."

He continued that "While polypropylene is insoluble at room temperature in all organic solvents, it does become soluble in aromatic solvents at temperatures in excess of 175 degrees. Some solvents such as trichloroethylene or tetrachloroethylene can also cause swelling at room temperature.

"However, aging tests on this new plastic show negligible changes in physical properties after 300 hours."

As another important factor in considering this new plastic Dr. Neumann cited its convenience of fabrication. It is easily formed, worked, machine shaped, formed and cut. Also, several welding techniques are highly successful and these include hot-gas welding and heated tool welding.

"For most hot-gas welding operations," it was stated, "weld values vary from 80 to 100 per cent of the parent material strength. Prolonged boiling of polypropylene welds in water has shown no significant decrease in tensile strength in periods up to 1000 hours.

"Also prolonged exposure of stressed

corner welds in the presence of atmospheric steam have not indicated any type of weld failure or degradation. This stability at temperatures near or above the boiling point of aqueous solutions shows numerous possibilities for expanding application of this new plastic in process equipment."

While testing and research continues on this new plastic, Dr. Neumann is firm in the belief that "in the not too distant future polypropylene will take its role in the industry as a practical solution where a corrosion and chemical resistant plastic for high temperature use is needed."

Process Joins Wet And Cured Concrete

One of the biggest and oldest problems of the multi-billion-dollar construction industry—joining fresh wet concrete to cured concrete—has been overcome with the development of "Uniweld," a new structural welding agent, according to an announcement by Permagine Corporation of America.

Perfected after years of research, Uniweld is an "alloy" of epoxy and nylon type synthetic resins which forms a permanent joint and water and vapor barrier—literally welding the entire contact area without any mechanical interlocking. Tension, compression, shear and impact tests show that the bond is many times stronger and tougher than even fully hardened concrete.

Secret behind the remarkable properties of the Uniweld bond is the epoxy-nylon type resin formulation. Epoxies are the only known materials which will form a tenacious bond with cured concrete. Because Uniweld is thermo-setting

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rather than thermoplastic, the curing process is irreversible and permanent. It does not depend on the evaporation of moisture or solvents and is totally unaffected by water, alkalies, mild acids and many other reagents. The Uniweld actually forms a waterproof membrane over the entire bond area as well as a permanent high-strength bond.

Uniweld also provides excellent adhesion to brick, stone, cinder block, gypsum block and other commonly used building materials, it is claimed. The only requirement is that the surface be reasonably clean and free of oil, grease or loose particles. Chipping, veing, notching and roughening of the base surface are unnecessary—as are keys, lugs, anchors and other devices now used to hold new concrete to old.

Use of the product is quite simple. The two components are mixed in equal volume—which starts the curing cycle—and a thin coating is applied to the surface by roller, brush or spray. The fresh concrete is poured directly on the Uniweld approximately 15 minutes later. Pot life of the mixed Uniweld, depending on temperature, is from one to two hours.

Engineering Firm Files with S.E.C.

Joseph V. Santry, chairman of Combustion Engineering, Inc., announced Dec. 23 that the company has filed a registration statement with the Securities and Exchange Commission relating to the acquisition of General Nuclear Engineering Corporation through an exchange of stock.

"General Nuclear," Santry said, "is engaged in rendering design, engineering, advisory, research and development services in the field of nuclear energy and is presently associated with several important nuclear power projects. It will be operated as a subsidiary.

"Dr. Walter Zinn, president of General Nuclear, will be in charge of all of Combustion's nuclear power activities. Dr. Zinn is one of the foremost scientists in the nuclear field and a pioneer in the designing and building of nuclear reactors. Under the late Dr. Enrico Fermi, he supervised the construction of the world's first nuclear reactor at Stagg Field, Chicago, early in World War II. From 1946 to 1956 he was director of the Atomic Energy Commission's Argonne National Laboratory."

Combustion has been active in the nuclear field for more than 12 years and has extensive facilities for the design, development, manufacture and testing of reactor systems, including both light and heavy components. Work now in process at these facilities includes fuel element fabrication, core assembly and manufacture of a variety of heavy components.

The company recently was awarded a contract by the Atomic Energy Commission for the operation of the Army Low-Power Reactor—a boiling water type—at the National Reactor Testing Station in Idaho. Another recent AEC project, in which the company will participate in association with the Stone & Webster Engineering Corporation, is a study of an advanced type of pressurized water power reactor.

Space Investigation Is Conference Theme

"Investigation of Space," is the theme of the 1959 National Telemetering Conference planned for May 25-27 at the Brown Palace and Cosmopolitan Hotel, Denver, Colo. The conference is sponsored by the American Institute of Electrical Engineers, the American Rocket Society, the Institute of Aeronautical Sciences and the Instrument Society of America.

Twelve technical sessions are scheduled. They will be on special telemetering techniques for satellites and space vehicles, sub-miniaturization, telemetering of bio-chemical information from the "Man in Space," transistorization and data processing. Four papers are planned for each session.

Max A. Lowy, of Data-Control Sys-

tems, Inc., Danbury, Conn. is the conference chairman and Allen P. Gruer, of Sandia Corporation, Albuquerque, N. M., is chairman of the Program Committee. Other committee chairmen include Elliott Ring, C. Benavides and Joseph McKenna, Martin-Dever; Hugh Pruss (vice chairman), Telemetering Corporation of America; J. L. McKinley, Public Service Company of Colorado; R. Francisco, Secretary, General Electric Company, Missile and Advanced Development Division; J. Winters, Thompson-Ramo-Woldridge; F. Venditti, Denver Research Institute.

Stainless Steel Gets "Real Cool" Finish

A new—real cool—finish called "Fro-Zon" is now being applied to stainless steel, giving the shiny metal a frosty appearance.

Developed by Stamping Service, Inc., of Detroit, Mich., the new finish is being used on automobile trim sections of stainless steel supplied by Allegheny Ludlum Steel Corporation.

The new finish is made possible by a type of "semi-blasting" technique which gives the metal a frosted look by forming tiny mounds on the surface of the metal. This process, which is put on very lightly and does not penetrate the surface of the metal, diffuses light rays and gives the frosted appearance.

All kinds of patterns, lettering, bossed, deposed, flat or contoured surface, can be handled by the new process. Also, the finish is applied after the stainless steel part is formed. At the present time the company has done work only in the automotive industry, but expects to take this process to other fields shortly. The

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developers are aiming at the home appliance, architectural, furniture, toy and related fields. Cooking utensil manufacturers are expected to be interested in the new finish, too.

Stamping Service, Inc. engineers will not disclose the method of applying the unique finish. They report that they can put it on any size, shape, type or gauge of a shiny surface of stainless steel. They have done most of their work on Type 430 stainless steel. This is the type used in the automobile industry for window trim, side and body mouldings and numerous other trim and functional parts of today's automobile.

Neither heat nor cold has any effect on the surface treatment, and under accelerated field tests weathering doesn't seem to have any effect either.

The Detroit company is also working on coloring with the new process, and reports that it expects to have an announcement on this shortly.

Soviets Back Auto. Control Technology

The Soviets are now "aligning tremendous manpower, productive capacity and technical talent" behind automatic control technology, William E. Vannah, editor of *Control Engineering* magazine, said in Cincinnati Dec. 8 at the annual meeting of the American Institute of Chemical Engineers.

In a speech about a recent tour he and his associates made of Russian technical institutes and installations, Mr. Vannah said that Soviet control engineers have "pulled abreast of their Western contemporaries in technical knowledge" and have "drawn slightly ahead in abstract theories of nonlinear control, random processes and self adaptive control."

There are important indications, he said, that "Soviet industrial management now recognizes automatic control as the most significant key to increased production." These indications are to be found in such conditions as the granting of higher production bonuses to the management and engineers of plants producing control products than to their counterparts even in plants as important to Soviet progress as truck and automobile works; the freedom given scientists and engineers at the Institute of Automatics and Telemechanics in Moscow to pursue their own special bents in development of theory, components or application;

and in arbitrary directives handed down to follow measurement standards policed by the Institute of Standards, Gages and Metrology.

In addition to their particular advantages, reported Mr. Vannah, control engineers and scientists also share with their fellows in other technical fields the benefits of high social and economic status. These inducements account in a major part, he indicated, for the intense desire to learn and develop which Soviet men and women in technical professions display.

Dr. Katz of U. of M. Is Head of Slate

A 1959 slate of officers, headed by Dr. Donald L. Katz, of the University of Michigan, Ann Arbor, as president was announced in Cincinnati Dec. 8 at the 51st Annual Meeting of the American Institute of Chemical Engineers (A.I.Ch.E.) in the Netherland-Hilton Hotel.

Other new officers elected were: Jerry McAfee, vice-president of the Gulf Oil Company, Pittsburgh, named vice-president; Dr. J. Henry Rushton, Purdue University, re-elected treasurer; and F. J. Van Antwerpen, Nutley, N. J. re-elected secretary.

Elected directors for three years were: W. R. Collings, president of the Dow Corning Co., Midland, Mich.; W. B. Franklin, head of the Technical Service, Division, Humble Oil Company, Baytown, Tex.; L. C. Kemp, Jr., vice president, Texaco Company, New York; and Roland Voorhees, associated technical director, Union Carbide Development Co., New York.

Dr. Katz, who is head of the Department of Chemical and Metallurgical

Engineering at the University of Michigan, also is an industrial consultant and technical author. He is co-author of a recent book, *Fluid Dynamics and Heat Transfer*, and of a handbook on natural gas engineering. He is a native of Jackson, Mich. and has earned degrees of bachelor of science in engineering, master of science and a doctorate from the University of Michigan.

"Sheer Bulk" Causes Transmission Change

Because of the "sheer bulk" of modern communications, conventional voice transmission in many commercial and other civil operations is giving way at a fast rate to printed record transmission.

Printed record transmission has already taken over in a very large measure in the military, C. H. Stewart II of Bell & Gosset Co., Morton Grove, Ill., said in New York on Feb. 4 in a paper presented at the Winter General Meeting of the American Institute of Electrical Engineers in the Statler Hilton Hotel.

The communications revolution in military operations, he reported, began with the heavy demands of World War II in controlling and supporting highly mobile combat forces. Today, the use of voice communications is largely limited to short range command functions and "it is conceivable that in the not too distant future, even this function will be supplanted by highly portable printing telegraph systems . . ."

The growth of civil printed record communications since the war, he stated, has been "analogous" to that in the military, but "has not been quite as spectacular."

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GUS BERTHOLD ELECTRIC CO.

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"The increasing acceptance of data processing and control systems require," he said, "an increasing use of printed communications techniques, such that the mass of high speed printed communications which present-day (civil) users believe to be absolutely necessary was once thought of as a luxury. Many manufacturing processes involve significant field operations which include a sizable mobile force, so that two-way transfer of data is becoming increasingly important to this class of users. The current philosophy of many companies is that this two-way transfer of data naturally extends to the field operations and it would appear that an ever increasing number of organizations are coming to this point of view."

Voice transmissions, Stewart explained, are generally not efficient or reliable enough to handle large volumes of data. They are hampered, he said, by the disadvantages of a relatively low transmission rate, an inherently high transcription error and the requirement for a relatively good communications circuit.

Transistor Tester Contract Awarded

The first transistor tester capable of checking the performance of transistors while they are connected within their circuits, is now being produced by Philco Corporation.

A contract to build more than 900 transistor testers has been awarded to Philco's Government and Industrial Division by the U. S. Navy's Bureau of Ships.

Under a previous Navy contract, Philco design engineers developed an unique combination of transistor circuits which resulted in this technical breakthrough—an in-circuit transistor tester.

Philco also announced that a commercial model of its new transistorized transistor tester will be available in the near future.

In-circuit transistor testing is extremely important since the method saves trouble shooting and servicing time without turning on power in the equipment.

Other commercially available transistor testers cannot perform in-circuit transistor measurements since they are unable to differentiate between normal

input and output signals generated by the transistor and spurious signals appearing at either the input or output terminals. These spurious signals arise from the sneak paths propagated by the circuitry surrounding the transistor under test.

Low impedance methods are employed in both the input and output circuits to nullify the effects of the external circuitry.

Investment Casting Improves Production

To improve a part by designing a more intricate shape is often not practical economically. But American District Telegraph by turning to a new method of production—investment casting—has come up with a superior restrictor plug at about 25 per cent of the cost of the plug formerly used.

The plug is used in ADT's Differential-Pressure Type Waterflow Detector Unit to absorb momentary surges in pressure. The original plug contained a simple orifice of 0.030 inches. It had a tendency to clog with marine growth and corrosion, and could cause false alarms by not compensating for momentary changes in pressure.

ADT engineers designed another shape, a cylindrical slotted plug with 25 drilled separate 0.0625 orifices. It would overcome the false alarm drawback, but machining and drilling costs would have been almost prohibitive.

In seeking a new way to produce it, however, ADT turned to Arwood Precision Casting Corporation of New York, and through a combination of investment casting and simple machining, the cost of the new plug was brought to \$1.66 per part. Then, through close cooperation of ADT and Arwood design engineers, the plug was still further redesigned and the cost brought down to \$1.05 per part.

The size, and number of the orifices in the new design effectively combat the tendency to clog and cause false alarms. The new plug is completely interchangeable with the old design, and has a comparable flow rate.

Vinyl Spray

A new liquid vinyl color spray that recolors and refinishes automobile interiors and convertible tops without

changing the original texture of the fabric is now on the market, reports *Chemical Week*. The sprayed finish is available in 12 colors, plus black and white. A single coat of the finish is said to be enough for most applications. It takes about a half-hour to apply the new coating to the convertible top, another ten minutes for it to dry.

MIDWEST ENGINEER Advertisers' Index

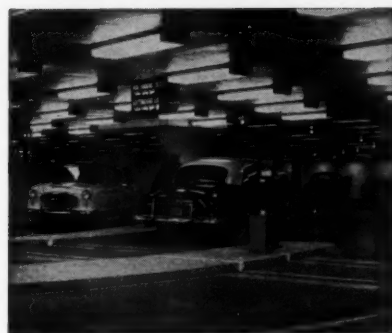
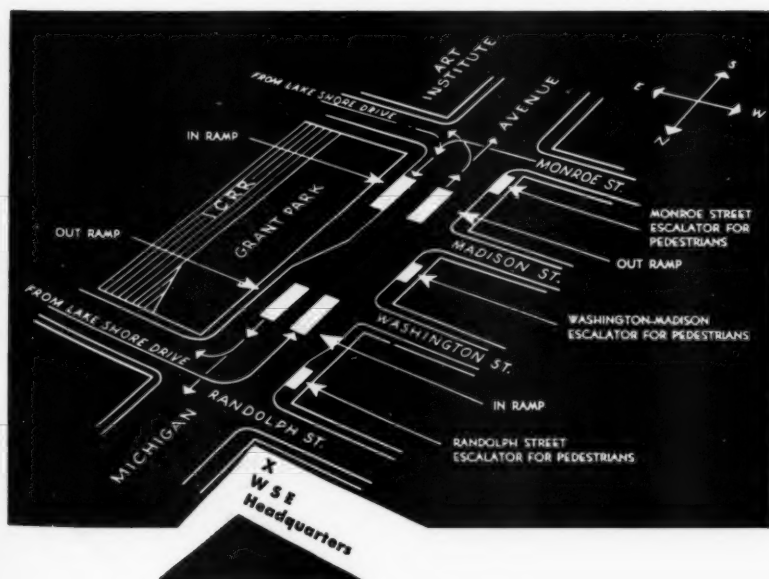
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SAY, ENGINEER!

Do you like to DRIVE?

Then why not drive to WSE meetings and other functions? There's plenty of PARKING almost at the door—the Underground Garage is diagonally across the street from WSE Headquarters (see the map below), two private garages are a block west, and the State-Wacker "Bird Cage" Garage is only a short distance away.

Below: map showing Park Department Underground Garage



Interior view of Underground Garage

If you're not driving it's still convenient to get to and from WSE meetings.

Here are handy stations or stops:

- The Cab Stand is just across the street
- The Elevated is one block west
- The Subway is two blocks west
- Buses stop at the door or within a few blocks for every part of town
- The IC Suburban station is across the street
- Other suburban stations are conveniently served by bus or elevated.

You see, your WSE Headquarters is at the handiest place in Chicago.

ENTER at either Monroe or Randolph Street on Michigan

EASY access, Speedy exit

ESCALATORS convey you to street level

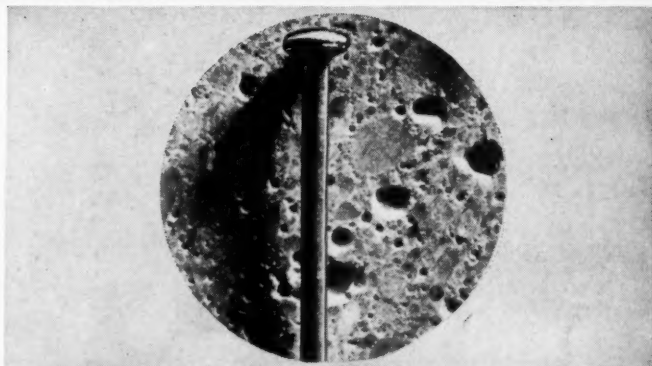
CAPACITY The garage with its 2359 parking spaces, is designed to prevent overcrowding.

3 points to watch for better winter concreting

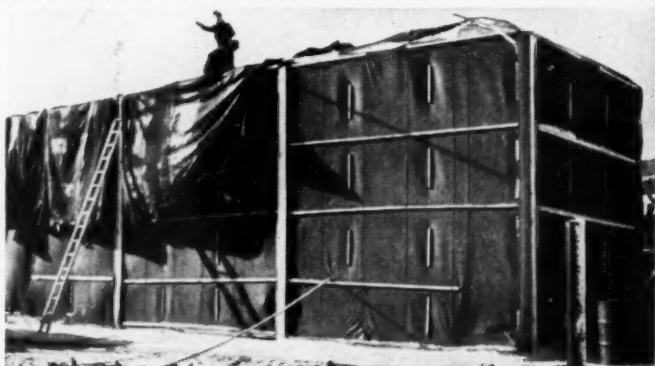
1. Plan ahead. Concrete will be delivered at a temperature between 50° and 70°F. Be ready to place at once. Have forms and reinforcing steel free from ice and frost—live steam works best. And, of course, never place concrete on frozen ground. It will settle when it thaws.



2. Specify air-entrained concrete for all jobs—structures and pavements. Resistance to freezing and thawing is greatly increased—freezing water in the concrete has room to expand harmlessly into the air cells. Magnified photo shows size of air cells compared with ordinary straight pin.



3. Provide suitable curing temperatures. Use protective coverings as needed, either with or without moist heat, to keep concrete at 70° or above for 3 days, or 50° or above for 5 days. Protect from freezing for at least 4 days. Rate of cooling concrete shouldn't exceed 1 or 2 degrees per hour.



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